RAILROAD GAZETTE

FRIDAY, JUNE 21, 1895.

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Contributions.

Colombian Finance and Railroad Concessions.

CARTAGENA,
REPUBLIC OF COLOMBIA, May 26, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The attention of the financial world, and especially of American capital, is being rapidly turned to Colombian railroad construction. For that reason it might be interesting to know something of the financial condition of the Colombian government with a view of throwing light upon the validity of railroad concessions that are dependent upon subsidies from the government. The Spanish official edition of Réclus, by Vergara, issued in 1892, gives the following:

Income	$26 831,657
Expenditures	29,178,463
Deficit	$2,346,806

And for the year previous (1891):

Income	$12,080,165
Expenditures	14,742,675
Deficit	$2,662,510

It is claimed that since the above was calculated, not only has the deficit increased yearly, but also that the government has issued over $11,000,000 of paper money, increasing the value of exchange to a ruinous rate. No effort has ever been made to pay the interest on the foreign debt, amounting to $12,000,000, or on the home debt, amounting to $23,000,000. Besides these items are the expenditures of the present revolution and the forced loans that have been levied, amounting to $8,500,000 to date, with the outlook for another outbreak in the country.

Of all the custom house receipts, 10 per cent. are laid aside for the redemption of the foreign railroad subsidies, paid to American and English companies: but as at present the custom house receipts are almost nothing, the holders of revenue bonds issued as railroad subsidies will have to wait indefinitely for their money.

CORRESPONDENT.

[The latest *official* estimates of revenue and expenditure that we have seen are, in pesos:

	1891-92.	1893 94.	1895-96.
Revenue	26,023,160	30,580,000	26,203,966
Exenditure	26,979 325	33,502 386	33,801 888

June 30, 1894, the official statement of the internal debt was 9,413,000 pesos, besides 26,136,000 pesos of paper currency. The external debt was £3,280,000, of which nearly half was deferred interest. The nominal value of the peso is one dollar, but the actual price of the legal tender peso last year was about 80 cents, and of the debased Colombian peso about 50 cents.—EDITOR RAILROAD GAZETTE.]

Railroad Telegraph Superintendents.

The fourteenth annual meeting of the Association of Railroad Telegraph Superintendents was held at Montreal, Quebec, on June 12. In the absence of President O. C. Greene, Vice-President M. B. Leonard occupied the chair.

After the Committee of Arrangements had read its report, five new members were elected, and Messrs. P. W. Drew (Wisconsin Central) and E. E. Rittenhouse (Atchison, Topeka & Santa Fe) were transferred from the honorary to the active membership list. The Treasurer's report, which was then read, showed a healthy condition of financial affairs. The election of officers resulted as follows: President, M. B. Leonard (Chesapeake & Ohio), Richmond, Va.; Vice-President, J. W. Fortune (Grand Trunk Railway), Detroit; Secretary and Treasurer, P. W. Drew (Wisconsin Central), Milwaukee, Wis. The next meeting will be at Fortress Monroe, June 17, 1896.

The afternoon was spent in a carriage drive around the city.

At the evening session, Mr. C. A. Parker read a paper on "Telegraph Line Construction." He said in part:

Careful attention to location, in building or re-constructing a line, will often save money; that is, either in first cost or subsequent maintenance, or both. A good foreman will always keep his line laid out some distance ahead of the work to avoid changes after the work is partly done. Mr. Parker's experience has been largely in the Rocky Mountains, where he sometimes finds it expedient to locate a line 800 ft. above the track to avoid snow slides. Lines should always be located where there is the least liability of trouble from washouts, from probable building of new tracks, from falling timber, etc. It pays to use tall poles to avoid trouble from boys and other mischievous persons. A few 40 ft. poles will often prevent much trouble from wires thrown up from stock yards where bales of hay are opened, and will also frustrate the schemes of the small boy who breaks insulators by throwing stones at them. A pole set in a ravine is to be avoided if possible. A long span is often preferable.

The paper was followed by an animated and practical discussion, Messrs. Lattig, Taylor, Drew, Selden, Annett, Hammond and others taking part. A committee of seven members was appointed to draw up specifications for standard line construction and to report at the next meeting.

On Thursday the first paper was by Mr. Ralph W. Pope, of New York City, on the Selection and Training of new operators. He said, in part:

The telegraph department of the railroad appears to heve been by common consent the acknowledged kindergarten of the telegraphic industry. Those particular telegraphers who have not passed through this primary department have missed a most important branch of training for their life work. In that branch which may be designated as the recruiting service, there is an opportunity for the adoption of a system which in the course of time would lead to good results in improving the personnel of all railways. It is quite possible that the voluntary assistant may not be of the proper timber out of which a first-class railroad man can be evolved, and it is at just this stage where a little quiet investigation might be judiciously introduced. The boy's school record could be readily looked into, also his home surroundings. A few questions which would occur to most of us would determine the aptitude of the boy. By attacking this problem at its very earliest stage there is little difficulty in enforcing the conditions. It is perfectly feasible to hold to the rule, that if students or helpers are to be tolerated, they shall first be reported upon with a view of ascertaining their adaptability to the business, and whether they seriously intend to continue in it. The question of preliminary education is not so important as many believe. A bright boy with an ordinary common school education, well grounded in the three R's, will find the railroad service itself an education as he grows up in it.

The next paper was on "Uniformity" by Mr. J. C. Ford, Division Superintendent of the Chicago Great Western. Mr. Ford emphasized the necessity of examining applicants at an early stage; that is, before they become students. He keeps students' records in the same book with the operators. If students are allowed to come into offices along the road without supervision they work into regular places without being noticed. Some of them are very poor operators, being appointed because they are honest and well meaning, and within a short time you hear this kind of men talking about their seniority. Mr. Ford discussed the propriety of having a registering machine on every train wire. If all conversations between dispatchers and operators were on record it would often facilitate the administration of discipline.

At the conclusion of the reading of these two papers, the President, on motion, appointed Messrs. Selden, Lang, Darlton, Sholes and Kinsman a committee to confer with the American Railway Association in the matter of standing rules.

The next paper was that of G. H. Thayer, of Chicago, on

TROLLEY CURRENTS AND AUTOMATIC SIGNALS.

On one of the lines entering Chicago a semaphore, operated by the track circuit, remained in the safety position when a rail was removed. Investigation showed that this was caused by stray currents from a neighboring street car line operated by electricity. The possible damage from such leaks led the writer to make a series of tests on a section of the Chicago & Northwestern in the outskirts of Chicago, where a trolley road is in close proximity. The trolley line runs parallel with the steam road for about five miles, with two grade crossings. The distance between the two roads varies from 100 ft. to 2,000 ft. The steam road is double-track and equipped with automatic signals operated by wire circuits.

Tests with Weston instruments showed a difference of potential between rails varying from one-half to five volts, and in a few instances the pressure ran up to 15 volts for a short time. The readings were taken about every 2,000 ft. over the entire five miles. There was no part of the section tested that failed to show the presence of the leaking current. At the two crossings mentioned, the rails of the steam road had been insulated in the usual manner with wooden fish plates and fiber wedges, preparatory to changing the signals from the wire to track circuit, and over these fiber insulations a current would flow sufficient to bring a five volt lamp up to candle power and to melt a three ampere fuse. These tests were made about the middle of November last, before the ground was frozen. Similar tests were made in January, with the ground frozen solid, and the results were found to be practically the same.

No effect was noted on the wire circuit signals, but on one section, which had been fitted up with the track circuit (the signal being located near the crossing of the roads), the signal would go to danger upon the approach of a trolley car and then resume the clear position after the car had crossed and passed on some distance. This action was accounted for on the ground that the trolley current was of opposite polarity to the signal current, thus devitalizing the signal magnet. While it may be true that, as a rule, a pair of wheels entering a section will short circuit both the battery current and the stray trolley current, thereby throwing the signal to danger, yet under some conditions it might not do so completely, and a train might occupy such section with a clear signal behind it.

The destructive effect upon water and gas pipes through electrolytic action, caused by leaking currents from street railways using a ground return, is well known. The time is not far distant when the municipal authorities and gas interests will find themselves confronted with enormous expense for renewals of pipes. This of itself may result in such radical changes in street railway construction as will insure a perfect return of the current to the power house independent of any pipes, tracks or other conductors that may be in its path. In Chicago where an extensive system of electric street car lines is under construction, great care is being taken to do this. In addition to securing as perfect bonding of rails as possible, heavy return wires are being erected on the poles. These return wires are connected to the rails about every 1,000 ft. The street car people expect that this will prove an effectual remedy. It remains to be seen whether their expectations can be realized. When it is considered that only one-tenth of a volt will hold a signal to safety when it is once up, even a small leak from a neighboring street car line is highly objectionable.

The absolute remedy for this difficulty is the double trolley. While strong arguments can be advanced against its use and in favor of the single trolley, the fact that one large city (Cincinnati) has the most of its street car lines fitted with double trolleys, and further that they are in satisfactory and successful operation, weakens the position of the single trolley advocates.

An interesting discussion ensued in which Messrs. Lang, Ryder, Lattig, J. B. Stewart, Leonard and Selden participated. All of these gentlemen had experienced the difficulties referred to in Mr. Thayer's paper on their respective roads, and described the methods adopted to overcome the evils.

The chair announced the committee on Standard Line Construction, Messrs. Taylor, Parker, Annett, Hope, Lattig, Stewart and Dwyer.

After dinner the Grand Trunk Railway took the party in a special train on a visit of inspection to the Victoria Tubular Bridge across the St. Lawrence.

The meeting re-assembled at 5 p. m., and the first paper was by Mr. R. B. Gemmell on the "Social and Moral Condition of Railroad Telegraphers." He said, in part:

Telegraphers learn their business and start out to work very early in life, and are thus taken away from the direct influence and guidance of social and moral home life They are consequently thrown upon their own resources, and in many cases, find themselves surrounded by such moral and social conditions as prove to be demoralizing to manhood. Unless he exercises the greatest self control, the young man will be led astray, will be rendered unfit for good and satisfactory service, and will be degraded mentally and morally.

Mr. Gemmell commended the action of prominent Western roads in enforcing a strict rule against liquor drinking and frequenting places of low resort; the white button movement of Mr. Coffin, and the aid given by many railroads to the Young Men's Christian Association; also the Erie for restricting Sunday traffic as much as possible. Continuing, he said:

"It is a well-known fact that a man will do more and better work in six days than in seven. No improvement has ever been made on the just and righteous old Mosaic law, which gave to man and beast one day in seven for rest. . . . Brain is as useful as brawn. A man must be more than a splendid animal. Moral strength should be coupled with the bright mind and the strong body, in order to give them proper direction and to insure that they will be a blessing and not a curse. The body is like the hull of a ship; the mind the machine that propels it; but the conscience, the moral sense, is the helm that guides it. A man's chief glory, however, is his spiritual strength. When you can call him moral, it is greatly to his praise. When you can call him spiritual, you exalt him to a much higher plane. A moral character is an excellent thing to have for this world. A spiritual character is an essential thing to possess for the next world.

"An official of a leading trunk line lately said: 'A railroad man should feel a personal interest in every other railroad man, and if such a state of things could be brought about, we should possess a far greater influence for good, personally, and for the various interests we represent, than we now have.' This is based upon the good old principle, 'Love thy neighbor as thyself.' If it were carefully followed and practised by railway officials, as well as by those who are employed under them, it would be of the greatest benefit to the employees, patrons and stockholders."

Mr. G. C. Kinsman, of the Wabash, then read a paper on the General Conduct of the Telegraph Superintendent's Office. He had noticed some roads on which train orders were not rigidly inspected. On his road all orders are sent to the office of the Superintendent of Telegraph weekly. Trainmen send their copies to the Train Master, and the latter, being on the road every day, watches the work of the operators. Mr. Kinsman quoted in full the paper of Mr. H. I. Miller, which was printed in the *Railroad Gazette* of May 10 last.

Mr. E. E. Torrey, Superintendent of Telegraph of the Michigan Central, read a paper on the Single Order Dispatching System of his road, including a description of his method of selecting operators. This paper is reprinted elsewhere.

We are obliged to postpone for a future issue, for lack of space, the papers of T. D. Lockwood, J. B. Stewart, C. F. Annett, W. F. Taylor and Dr. Louis Duncan.

The Canadian Pacific tendered a free excursion to Quebec, with two special sleeping cars on the 10:30 p. m. train. Nearly all of the party accepted. On Friday, after breakfast at the Chateau Frontenac, on Dufferin terrace, Quebec, the morning was spent in driving around the city and visiting points of historic interest. After dinner, through the courtesy of W. R. Russell, Superintendent of the Quebec, Montmorency & Charlevoix Railway, the party made a trip on a special train to the Falls of Montmorency and then to St. Anne, where the shrine of St. Anne de Beaupre is located. On the return from St. Anne a few of the gentlemen visited the station of the Montmorency Electric Power Co. On Friday afternoon an elegant set of silver knives, forks

and spoons was presented to Mr. J. W. Fortune, of the Grand Trunk.

EXHIBITS.

Mr. Charles Selden (B. & O.) showed a new telephone in practical operation. The apparatus consisted of a Collier receiver and Brown transmitter, both English inventions. A line was run to a distant part of the hotel and the talking powers of the instrument were tested. Conversation and whistling carried on several feet away from the transmitter were reproduced with remarkable loudness and distinctness. American patents have just been issued on this instrument, and arrangements are now being made for its manufacture in this country. A Canadian company is also being formed. Mr. Selden controls the American and Canadian patents.

Dr. Percy L. Clark represented the National Self-Winding Clock Company, Chicago, and exhibited one of the clocks. This clock is wound every 15 minutes by the simple action of a pair of magnets and a specially designed cam movement. By the use of the magnets all of the complications incident to the use of electric motors are avoided. The synchronism and winding is effected by the same current from one battery and provision is made to avoid evil results in case of crossing or other derangement of the synchronizing circuit.

Mr. Charles Blizard, of the Electric Storage Battery Co., Philadelphia, exhibited six cells of the well-known "Chloride Accumalator" two of six ampere-hours capacity; two of 12½ ampere-hours. These cells showed the plates in the various stages of manufacture.

Telegraph Department of the Michigan Central.*

The Michigan Central system of train dispatching is radically different from that used on most other roads. It was on May 1, 1856, nearly forty years ago, and when there were only about twenty-two thousand miles of railroad in this country, that this system in its earliest form was begun; and each feature as it stands to-day is the result of careful study, cautious test and intelligent discrimination on the part of successive superintendents. This road was among the very first to undertake to handle its trains by the use of the wires. In fact, I believe that one of the roads which later became a part of the old Erie was the pioneer, and the M. C. was the first to follow.

It is a single order system, wherein the holding order plays a most important part—in fact, it would not be much amiss to call it a holding order system. There are two kinds of orders only, the holding order, which is addressed to the operator at the meeting point; and the moving order, which is addressed to the conductor and engineer of the train, the latter being signed by the conductor only. Our orders are not numbered, but are simply dated and timed, and no operator ever has in his possession more than one holding order which is in force. The conductor and engineer may have two orders in force at the same time, but one is the order received upon leaving the terminal and the other orders them to meet some other train upon the trip. Operators are not permitted to read either moving or holding orders to conductors or in any way communicate the intent of the order, but conductors must read aloud to the operator every order received at his hands. The conductor is required to carry all orders received to the engineer of his train, and the engineer must, in turn, read them aloud to the conductor. An operator's duty in relation to the movement of trains is fully set forth in the holding orders addressed to him, but is unaffected by moving orders addressed to the train. Our holding orders are in various forms; those most frequently used are as follows: "Hold all trains for orders;" "Hold No. 14 and No. 23 for each other;" "Hold Jones extra East and Smith extra West for each other;" "Hold No. 2 until 10:30 a. m. for Brown extra West. Hold Brown for No. 2."

The only freight trains appearing upon our time-tables are way freights, which do local work. Of these we have one each way on each division of the road. All other freight trains are known as extras, named for the conductor in charge, are entirely independent of each other, and are wholly in the hands of the dispatcher. Irregular passenger trains are known as specials, and are handled in a similar manner. Neither specials nor extras have any rights over regular trains, except such as the dispatchers may give them.

A holding order is encountered wherever two trains meet upon single track, and frequently, in case of freight trains, a whole trip is made without the use of any other kind of order. Each train, of course, receives a moving order before leaving the terminal, and a passenger train always has moving orders before meeting a passenger train, as well as in meeting a freight, when it is necessary or desirable to assist the freight. Freight trains to meet passenger trains must also have moving orders when they cannot reach the meeting point upon their own rights. When two trains are to meet, the holding order must be sent to the operator at the meeting point, then the train having the right to the road must receive orders to meet the opposing train at such point before the latter receives its order. For instance, suppose that No. 2 and No. 15 are to meet at Lawton, the necessary orders are as follows:

JACKSON, May 20, 1895.

OPR. LAWTON
Hold Nos. 2 (two) and 15 (fifteen) for each other.
JACKSON, May 20, 1895.

C. & E. No. 2,
Niles,
Meet No. 15 (fifteen) at Lawton.
JACKSON, May 20, 1895.

C. & E. No. 15,
Kalamazoo,
Meet No. 2 (two) at Lawton.

In this case No 2 has the right to the road and receives its order first; therefore it will be seen that the train having the right to the road has been instructed in regard to the meeting point before giving to the opposing train the necessary assistance in reaching Lawton.

In the wording of orders it is our aim to be as brief as conciseness will permit, and the language of an order of a certain kind is the same upon all occasions and upon all divisions of the road, and it has seldom happened that mistakes or loss of time have occurred through misconstruction or lack of comprehension of the language used.

Considering the simplicity of our dispatching system, its flexibility and the splendid record which has been made under it—a record of an enormous business handled and of few collisions chargeable to it—I believe I am correct in my belief that we have reached the acme of the art of safely and rapidy getting the wheels over the rails. We have a book explaining our system, and I shall be glad to mail a copy upon application.

And now I come to that bulwark of our fortunes, our boys. They are only boys, the most of them; but how manly, how faithful, how full of enthusiasm for their work and how loyal to their company! In the past 15 years only two collisions are chargeable to them. Such a force cannot be assembled at a moment's notice, but is the work of time and strict adherence to a settled policy. Nearly all these operators, and our dispatchers as well, commenced as students in our offices, and all they know of telegraph and railroad work has been acquired upon our lines. Before they began as students they each paid a visit to my office, where the young man was unconsciously made to demonstrate his native ability and the extent of his education. He was not asked to come in for the interview until after the operator had requested permission to take the young man as student; and this action is always voluntary on the part of the operator, no one ever having been required by me to take a student. The operators are careful to select intelligent and moral young men for their students, because, if otherwise, they are quite sure to find their request denied. After sufficient practice and study the student is brought to my office for examination upon telegraphy and upon certain rules, and, after passing, becomes an extra operator, under which title he serves when called upon, working in many offices and acquiring a large experience in the various duties required of an operator. When he has become the oldest man on the extra list, he is eligible to a regular position as night operator when a vacancy occurs.

Of train dispatchers we usually employ about forty-five, and it is required that each shall have had a thorough experience as an operator upon our lines. At each division headquarters we have one or more extra dispatchers, who are called upon to relieve the regular men when necessary or desirable, and who work as operators when not relieving. To prepare the extra dispatcher for his duties, he is put into the dispatcher's office, where he continues for a month or two months—under pay, of course—watching and listening to the work of the dispatchers and, finally, toward the end of the period of instruction, receiving reports of trains and sending orders under the eye of the dispatcher who has him in charge. At the close of this schooling he is given a searching examination, covering every possible phase of train dispatching, and until this examination has been satisfactorily passed he cannot be permitted to take a "program." Eventually, when a vacancy occurs, he becomes a regular dispatcher.

*A paper by E. E. Torrey, Superintendent of Telegraph, Michigan Central Railroad, read at Montreal Convention, June 13, 1895.

Shall a Car Service Association be a Collecting Bureau?*

Filled with sincerity and suspicion, and with the utmost honesty of purpose, some of my members have advocated the collection of all car service by association employees. The guilt of their competitors was only limited, according to their belief, by the catalogue of crimes, and if the association would only assume the collection of all car service earnings, the favored shipper would be known only in history. My answer to these earnest but misguided enthusiasts, has been that such a procedure would utterly fail to accomplish the desired purpose; that it would not touch the tap-root of the difficulty.

No agreements entered into by railroads have ever been as nearly carrried out as the various car service agreements. Even if all competitive revenue were handled by a third party, the faithless road will be faithless still. I do not believe that car service is secretly refunded to any great extent. It is evidence of very general enforcement of rules that the average per car consignee delay in all our associations is but a small fraction over one day. Wherein is the virtue of Association collectors? Would they remove all opportunity for dishonesty? No. Would they meet with any better reception from the public than the regular agent? No. Would they be entirely free from corrupting influences? No. Who would watch the association collectors? It never pays to employ one man to watch another. If an agent is found violating rules, he should be removed. If his management decline to remove or discipline such agent, and in other ways countenance his irregularities, such management would defeat the ends we seek, even though the association collected every dollar due.

If car service is not a legitimate charge, abandon it. If it is right, why try to avoid the necessary responsibility? The roads cannot escape responsibility in the eyes of an intelligent public. The agent is the executive official of the road at each station; to him the public look to carry out the contracts and instructions of his company. Why curtail his local authority by employing another man to whom the public must look for a very small part of the station's business?

If the checking of tracks at large terminals necessitates the employment of extra help, men might be employed for such work, but they should be subject to the direction of the agent or agents. They could not act without the assistance or authority of the agents in closing cars or removing them to inaccessible spots when payment of charges was refused. On almost all roads, car service records are made by clerks who would be employed by the road in any event, and the information required by the accounting department of most roads, is all that is necessary for the car service reports.

If roads would take pains to see that their own agents were enforcing our rules, and would thoroughly sustain the manager by correcting the shortcomings of their agents, no radical change in our system would be desired. Agents will not generally run the chances of losing their position by violating rules when they have been told in plain English by the proper party that such rules must be enforced. A little more confidence in each other on the part of roads and eternal vigilance on the part of the manager in ferreting out and exposing agreement violators, wherever they may be found, will result in increasing the efficiency of our present system. Let the Associations keep within their prescribed bounds. Let them check, inspect, supervise and arbitrate. Let them construe, educate, advise and assist in the honest and fair administration of the rules. Let them inspect thoroughly, and, if possible, systematically, not spasmodically and superficially. Let them understand that they are not revenue bureaus, but car *service* associations.

* Abstract of a paper read at the annual convention of the Association of Car Service Managers at Cleveland, O., June 18, by Mr. A. J. Elliott, Manager of the Illinois Car Service Association, Peoria.

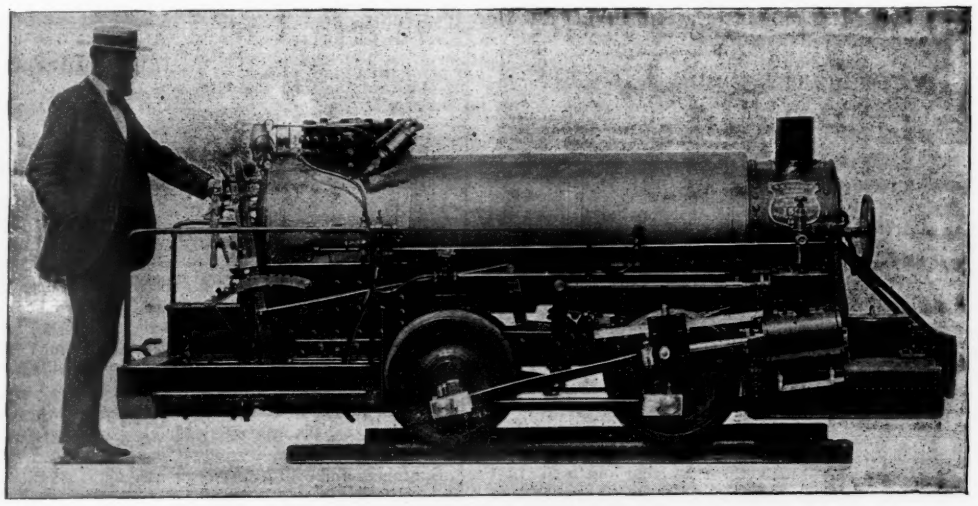
Collection of Demurrage by Association Employees.

The benefits obtained by having the tracks checked, and the bills and collections made by employees of the association, was the subject of a paper read at the Cleveland Convention of Car Service Managers, June 18, by Mr. D. T. Bacon, Manager of the Indiana Car Service Association. Mr. Bacon said, in substance:

After an experience of four years, working under the rules originally adopted by most associations, that of having the railroad agents make all reports, as well as bills and collections, we found at the end of that period we were not collecting as large a percentage of our earnings as we should, and that the refunds allowed made considerable reduction in our revenue. On Jan. 1, 1894, the checking of all tracks, and making of bills and collections at Indianapolis, was placed in charge of the Manager of the Association, and from that time to the present the work has been carried on by employees of the association without friction between agents and shippers, and with but slight objection from the latter to paying bills when presented.

The only report we require from agents is one showing car numbers, time of arrival, name of consignee and when ordered. We do the rest. We take daily checks of every track in the city between 7 and 10 a. m., and from these checks our records are kept, and bills made if service accrues. As there are 250 private side tracks in the switching limits of Indianapolis, the necessity of knowing the condition of all cars upon them, at least once every 24 hours, is apparent, and as this cannot be guessed at, a visit by some one is required. In making these checks our clerks learn whether cars are properly placed, whether consignees are allowed all free time that they are entitled to, and whether they will or will not pay car service. If the consignee is a party inclined to dispute, refuse or defer payment of charges, and the car is about unloaded, bill is at once made out, presented, and if payment is declined car is switched out or locked and held until settlement is made, and that customer is not allowed to owe any road in the association another dollar unless we have the car and property in our possession to make it good. All car service bills are made by our employees, who also present and collect the same, giving receipts in name of agent of the road upon whose track it was earned. These collections are turned over to and receipted for daily by the cashiers of the roads to whom they belong.

Our agents are greatly pleased with this manner of carrying out the rules, and would not return to the old method if they could. This system places the responsibility for enforcing the rules strictly upon the Association, and agents can truthfully say they have nothing to do with the matter, if shippers apply to them for exemption or extension; and as we make no bills unless certain they are correct, and the time charged for has actually been used; also cut out detentions accruing on account of failure to notify, bad weather or bunching in transit, we have reduced claims for refunds to almost nothing. The amount of earnings collected, when in the hands of agents, averaged 65 per cent., and of this about 15 per cent. was refunded. Our reports for the past year and a half show the collections have been 99 per cent., and the refunds less than 1 per cent., while the average detention has been reduced from 1.80 to 1.70 days per car. These results having been attained without any increase in employees, and with a decrease in the expenses of the Association, are such as to commend the plan to favorable consideration.



A THREE-AND-A-HALF TON LOCOMOTIVE.

Built by H. K. PORTER & Co., *Pittsburgh, Pa.*

A 7,000-lb. Locomotive.

The illustration herewith from a photograph shows a small mining engine built by H. K. Porter & Co., of Pittsburgh, which is the smallest locomotive ever built by that firm, and probably the smallest ever built in the United States for regular work. The locomotive was built for the Mount Pleasant Mining Co., of New Jersey

and hauls iron ore at the bottom of a perpendicular shaft 800 ft. deep. The cylinders are 5 in. in diameter by 8 in. stroke. There are four driving wheels 20 in. in diameter. The wheel base is 3 ft. The total weight of the engine in running order is 3½ tons. The length over bumpers is 11 ft. The boiler is of cast steel throughout, and is 23 in. in diameter. The dome is 5¼ in. high. The boiler has 29 flues 1¾ in. in diameter and 56 in. long. The tank has a capacity of 50 gals., and is carried under the front end of the engine. The water is supplied by two No. 2 injectors. The engine is built without cab, bell or sandbox, and is to pass through an opening 52 in. high and 52 in. wide.

The Union Electric Automatic Disk Signal.

We illustrate the new form of electric automatic disk signal, manufactured by the Union Switch and Signal Co. at Swissvale, Pa. This signal was originally patented in 1872, and manufactured by the Union Electric Co. Since that time it has been gradually improved and simplified until the present form has been reached. As it now stands, the appearance of the signal, although more graceful in its outlines, is practically the same as it has always been, but the internal arrangement is quite different.

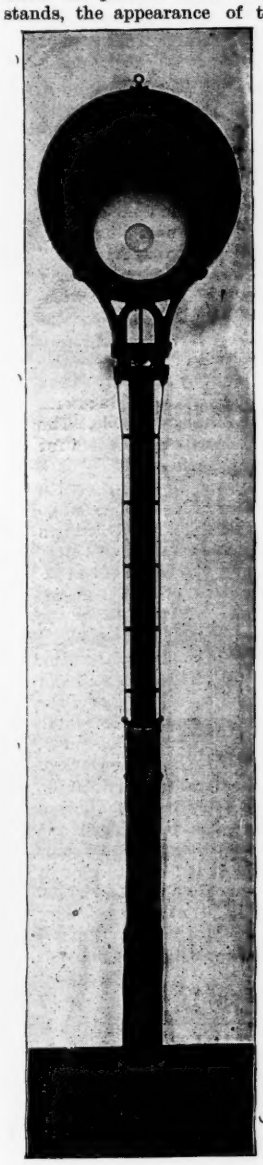


Fig. 1.

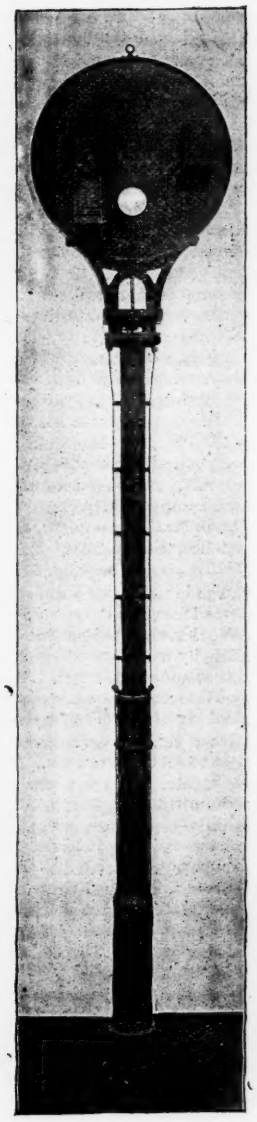


Fig. 2.

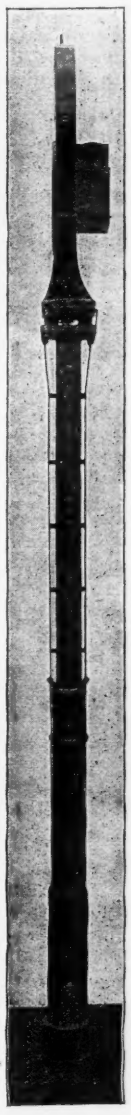


Fig. 3.

The Union Electric Automatic Disk Signal.

The electro-magnet which entirely controls and operates the signal, contains some special features, and its armature is of the revolving type which has been used so widely in annunciators and other electrical instruments. Through these arrangements the battery power necessary for operating the signal has, it is said, been reduced to a quantity much below that required by any other signal of its class.

The case in which the signal disk only is contained, is formed of two thin sheets of pressed steel riveted externally to a third band of steel which forms the edge. The joints are caulked and the whole is hermetically sealed. The electro-magnet is contained in a separate box fastened to the back of the case and also made perfectly tight, but, unlike the case, it can be opened with a key, which is furnished only to the repair man. By sealing these coverings the moisture is excluded and the troubles found in this kind of signal are, it is said, entirely banished. These troubles are usually manifested in a necessity for frequently adjusting the length of the rod that supports the signal disk, due to a change in the weight of the disk whenever it becomes more or less wet. By excluding the air from the case the humidity must remain the same, and any change in the adjustment is therefore unnecessary. The likelihood of any more trouble is further reduced by making the disk of a non-absorbing material. Aluminum has been chosen for this purpose, covered with an enamel which is not cracked by any changes in temperature, which does not fade, and to which the moisture does not adhere. Lightness, strength and resistance to corrosion are elements of so much importance that aluminum has been used in the construction of this signal in every suitable place.

The back and front plates of the case are but three inches apart so that it is possible to have the signal disk lie in a plane close to the glass in the front plate, insuring a distinct signal at all times and greatly increasing the efficiency of the lamp since its rays are not diffused.

The front and rear glasses are of heavy plate, enclosed in brass rings that are fastened to the case; an air-tight joint is secured by means of gaskets.

The lamp is mounted on a revolving base and is so constructed that to extinguish or clean and fill it, it must be moved from its central position where it is held locked during the night. By this ingenious arrangement the same openings in the case are made to illuminate the interior of the case during the day and transmit the light from the lamp at night.

Owing to the lightness of construction it has been found possible to make the whole case revolve on its bearings. This enables the lamp man or repair man to bring any part of the signal into reach while standing on the ladder, which is fastened to the rear of the post. More important still, the signal may be turned with its edge toward approaching trains, when it is desired to place it out of service, and kept in that position for an indefinite time. The signal may be identified at such a time by a number or letter placed on the side of the lamp. The lamp and case are locked by the same key and this is furnished to the lamp man; but the box containing the electro-magnet can only be entered by the repair man, who alone is in possession of the key that opens it.

An entirely new product has been utilized for making the changes in the colors at night. It was made in Holland and was discovered by the Union Switch & Signal Co. in its search for a material lighter and less friable than glass, and nearly if not quite its equal in clearness and brilliancy of color. It is therefore possible to build a signal which shall give any combinations of color that are now recognized as desirable. A small circle of this material is placed in the center of the aluminum disk and, if a color other than white is desired for a clear signal, another small circle is arranged in such a way as to be in front of the lamp when the disk is withdrawn.

Fig. 1 shows the signal in its clear position, the movable disk withdrawn. In the danger position the disk fills the opening in the case. Fig. 2 is a view of the rear of the case; here the box containing the electro-magnet is seen and the lamp occupies its "daylight" position. In Fig. 3 the case is turned 90 deg. and the edge is exposed.

The signal is arranged to work in connection with the track circuit which is now so well known, has been so continually recommended by the Union Switch & Signal Co. and so often referred to in our columns that no futher description of it is necessary.

Testing Steel-Tired Car Wheels.

At the May meeting of the New York Railroad Club Mr. Higgins, Superintendent of Motive Power of the Lehigh Valley, introduced as a topic for discussion the method of inspecting steel-tired wheels, under passenger cars, at station stops. His road has in service about 10,000 wheels with cast iron centers and steel tires welded on, and what he says is meant to apply to such wheels rather than to those that are built up.

The first essential is a smart and capable inspector. It is best to provide such an inspector with a torch and a hammer, or instead of a hammer a wrench. Mr. Higgins is disposed to think that a wrench is better than a hammer. The inspector must be instructed to carefully inspect the inside as well as the outside face of the wheel, and a careful man with good eyesight will thus detect more defects than by using a hammer. A few months ago one of his inspectors detected a defective steel tire which had not been revealed by tapping with a hammer After the wheels were removed, several persons were asked to test them with a hammer as they stood mounted on the axle. Each person who tried the wheels thus pronounced that the good wheel was the one with the defective tire, and all thought that the defective wheel was sound; which goes to show the chances of error in the hammer test. There are many defects which the hammer has nothing to do with, such as sharp flanges and flat spots. If inspectors are provided with hammers they are more than liable to merely tap the wheels and pay no further attention to them.

MR. MITCHELL said all of his passenger cars are equipped with steel-tired wheels. They are all built up, mostly Paige and Snow wheels. They are inspected by the eye. The Snow wheels are now mostly without bolts. The inspection is of the retaining ring and for flat spots. In the Paige wheel but few have been found with the bolts loose. The hammer test is not used.

MR. BLACKALL said that they inspected by sight only; do not use a hammer. They are particular about the thickness of the tire and about sharp flanges.

MR. MONTGOMERY concurred in the idea of inspection by the eye and hand rather than the hammer. Inspecting a steel wheel need not be as close and thorough every day or every trip as that of cast iron wheels.

MR. EDWARDS said that in his experience he could not tell any difference with the hammer in the case of a steel-tired wheel. He had tapped the track and then the wheel and it was hard to say which was the best. With the steel-tired wheel the only safe inspection is with the eye. Even with cast iron wheels if you tap 20 pairs of wheels there will not be any two that will sound alike. The only sure and safe way is to inspect the wheels by the eye. In testing for flat wheels his inspectors pass the hand over the tread. They are also instructed to stand at each end of the yard and listen to the trains as they pass.

MR. F. D. ADAMS has had over 25 years' experience with steel-tired wheels on passenger equipment and engines. He depends mainly on the eye in inspecting them. He has never had an accident from a broken wheel in passenger service. They used to inspect every fifty miles, but it is now done about once in 100 miles, which answers every purpose. Inspection is done by passing the hand around the wheel to detect flat places, and by thorough examination with the eye. He thinks that at this day no one questions the economy of using steel wheels under passenger trains instead of iron. He can get more mileage out of steel wheels with less money than out of iron wheels. Boltless wheels are best. In bolted wheels the expansion of the tire will loosen it to some degree, bringing a strain on the bolts. Bolts will then gradually wear and be cut off. He has more trouble with bolts cutting off than getting loose. A solid cast iron center with a steel tire is a good wheel. It is as cheap a wheel as he has ever bought, and gives as good service for the money. If the matter were left to him entirely he would not buy a bolted wheel under any conditions.

MR. MENDENHALL said that inspection in transit must be very hurried, and can best be done by the eye. Inspection for flat spots and sharp tires had better be made at the end of the run, 900 or 1,000 miles being about the maximum of the usual passenger run. His road has recently required the train crews to report flat wheels, which seems to be about the best way of discovering them.

Railroad Legislation in New York.

The legislative session of 1895 has devoted very little time to railroad matters. There has been a decrease in the number of bills introduced for the purpose of securing money for their defeat. Senator Owens' bill, concerning hours of employees on street railroads, failed. It was not vetoed, but was one of the 30-day bills which died from inattention.

Of the bills which have become laws, perhaps the most important is that relating to mileage books. It reads:

"Every railroad corporation operating a railroad in this state, the line or lines of which are more than 100 miles in length, and which is authorized by law to charge a maximum fare of more than two cents per mile and not more than three cents per mile, shall issue mileage books entitling the holder thereof to travel 1,000 miles on the line or lines of such railroad, for which the corporation may charge a sum not to exceed two cents per mile. Any railroad corporation which shall refuse to issue a mileage book as provided by this section, or, in violation thereof, to accept such mileage book for transportation, shall forfeit $50, to be recovered by the party to which such refusal is made; but no action can be maintained therefor unless commenced within one year after the cause of action accrued."

A bill by Mr. Eldridge provides for the extension of time for the commencement of construction or completion of railroads. Any company which has already acquired one-third of its right of way, or begun the construction of any portion of its railroads, has its time extended five years from Jan. 1, 1895.

A bill introduced by Senator Higgins amends Chapter 388 of 1890, the weekly payment act. Steam surface railroads are by it required to pay employees by the 20th of each month the wages earned in the preceding month. The bill allows steam surface railroads to pay monthly.

The Buffalo grade-crossing bill, introduced by Mr. Gerst, is at last successful. It provides that if within sixty days any railroad company whose tracks cross any of the streets of that city at grade shall not have entered into a contract with the city for the purpose of performing a portion of the plans of the Grade Crossing Commissioners, or shall not have notified the Commissioners, to apply to the Court for the appoint-

ment of Commissioners, as provided for by the law, then the said Grade Crossing Commissioners may designate the proportion of the cost of the work to be paid by such company to carry out said plans and may compel the payment thereof in whole or by installments, as they may require, by writ of mandamus.

Chapter 1,040 is another bill presented by Assemblyman Gerst, confirming the official acts of the Buffalo Grade Crossing Commissioners.

A bill by Mr. Malby amends the railroad law (Sec. 84) concerning consolidation. A bill introduced by James W. Husted, son of the late Speaker of the House, amends Sections 59 and 91 of the general railroad law. It strikes out from Sec. 59 the few lines which excepted street railroads from its provisions. This is the section that requires a certificate, from the Railroad Comissioners, that a railroad is needed before construction can be commenced. The other section amended, No. 91, is in relation to the consent of property owners and local authorities. It now requires the consent of the owners, *in cities and villages*, of one-half in value, and in towns, not within the corporate limits of a city or village, of the owners of *two-thirds* in value, of the property, etc. The consents of property owners in one city, village or town, shall not be of any effect in any other city, village or town.

A bill by Mr. Percy amends Sec. 77, Art. 3, relating to foreclosures and sales. Decrees of the United States Courts are now recognized the same as those of State Courts.

The street railroad employees' law reads as follows:

Any railroad corporation may employ any inhabitant of the State, of the age of twenty-one years, not addicted to the use of intoxicating liquors, as a car driver, conductor, motorman or gripman, or in any other capacity, if fit and competent therefor. All applicants for positions as motormen or gripmen on any street surface railroad in this State shall be subjected to a thorough examination by the officers of the corporation as to their habits, physical ability and intelligence. If this examination is satisfactory, the applicant shall be placed in the shop or power house where he can be made familiar with the power and machinery he is about to control. He shall then be placed on a car with an instructor, and when the latter is satisfied as to the applicant's capability for the position of motorman or gripman, he shall so certify to the officers of the company, and, if appointed, the applicant shall first serve on the lines of least travel. Any violation of the provisions of this section shall be a misdemeanor.

The bill compelling street railroads to give free transportation, and telegraph and telephone companies free use of instruments, to firemen and policemen on duty, was introduced by Mr. O'Sullivan. A Mayor may issue, under the seal of his office, to each policeman and fireman a certificate of his appointment, specifying the duration of his term of office; and it shall thereupon be the duty of every street surface and elevated railroad company carrying on business within that city or village, to transport every such policeman or fireman free in the course of the performance of the duties of his office. The Albany (street) Railroad has already decided not to recognize this law, and it will probably be tested in the courts.

The foregoing are all the railroad laws of general interest which have been signed by the Governor. There were the usual number of laws prohibiting railroads on streets and avenues in New York City. Some time before the legislature finished up its work Assemblyman Nixon offered a resolution providing for the investigation of the workings and management of the railroads of the State. The resolution was lost. Just before the session closed Mr. Nixon moved a reconsideration, which was carried, and the resolution was adopted. Consequently Mr. Nixon will, as the Chairman of the committee appointed by Speaker Fish, investigate this summer in conformity with the resolution.

Interstate Commerce Statistics to June 30, 1894.

The Statistician of the Interstate Commerce Commission has completed his seventh annual report, which is for the year ending June 30, 1894, and the principal totals have been given out to the press.* Most of these are given in tabular form below. Others appear in the comments of the Statistician, who says:

"This report covers the last four months of the Columbian Exposition, when passenger traffic was heavy, but for the remainder of the year the business depression had its full effect. On June 30, 1894, the number of roads in the hands of receivers was 192, operating 42,000 miles and representing about one-fourth of the total capitalization. During the year covered by the report 15 roads (1,734 miles) have been merged, 22 roads (2,352 miles) reorganized and 14 roads (1,590 miles) consolidated. Over 56 per cent. of the total mileage of the country is operated by 44 roads, and 90 roads operate 82.9 per cent. of the entire mileage.

"The increase in the number of locomotives during the year was only 704. The increase in the number of cars was only 4,132; whereas in the year before it was 58,854. Many worn-out cars have been destroyed and not replaced. During the year 1,579 locomotives and 30,386 cars were fitted with train brakes, and 1,197 locomotives and 34,168 cars were fitted with automatic couplers. About 75 per cent. of the total equipment is still without train brakes and 73 per cent. without automatic couplers. Of the total amount of railroad stock, over three billions, or 63.43 per cent. received no dividends. It will be seen that the amount of dividends paid was very much larger than the amount of net earnings available for dividends, so that there was a deficit from the operations of the year of $45,912,044. The amount available for dividends is nearly 50 per cent. less than it was in the previous year. The number of passengers carried was about 620 millions, and the number of tons of freight about 648 millons. [The passenger mileage and ton mileage are not given.] The statistics of employees killed and injured show a large falling off from the preceding year."

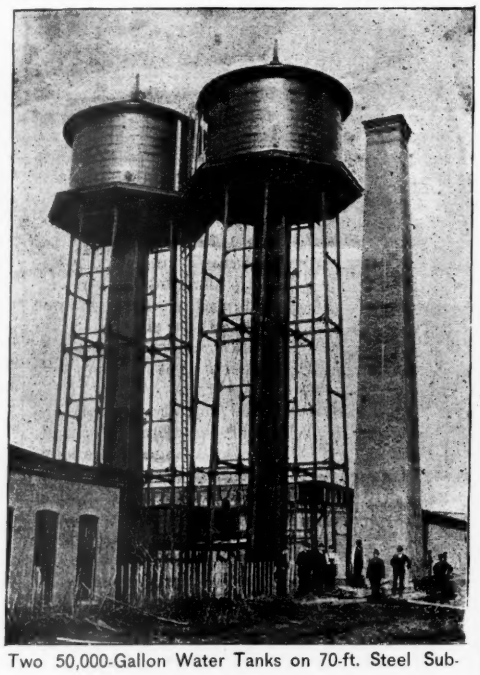
Miles of railroad completed	178,708
Increase since June 30, 1893, miles	2,247
Miles of track	233,593
Number of corporations	1,954
Locomotives	35,492
Cars	1,278,073
Employees	779,608
Decrease since June 30, 1893 (11 per cent.)	93,994
Capital stock (common)	$1,103,584,166
" " (preferred)	730,491,493
" " (total)	4,834,075,659
Funded debt	5,356,582,019
Current liabilities	605,815,135
Dividends, for the year	95,575,976
" average rate, on dividend paying stock	5.41
Gross earnings, year	$1,073,361,797
Decrease from previous year	147 390,077
Operating expenses	731,414,322
Decrease	96,506,977
Decrease in expenditure for M. W. p. c.	15.12
Decrease in expenditure for maintenance of equipment, p. c.	17.32
Net earnings	$341,947.475
Other income	142,816 805
Fixed charges, etc.	429.008,310
Net, available for dividends	55,755,979
Employees killed	1,823
" injured	23,422
Passengers killed †	324
" injured	3,034

* A preliminary report, covering about 85 per cent. of the total mileage of the country, was issued last December and was printed in the *Railroad Gazette*, page 857. A synopsis of the eighth annual report of the Commission, with some statistics for the year ending June 30, 1893, was printed on page 849.

† The number of passengers killed *in train accidents*, according to the *Railroad Gazette* record, was 166, and of employees 321.

A Pair of High Water Tanks.

The illustration, from a photograph, shows two water tanks each 16 ft. × 24 ft., of 50,000 gals. capacity, standing on steel towers 70 ft. 8 in. high. These were erected by Messrs. Fairbanks, Morse & Co., of Chicago, for the Boston & Albany Railroad at West Springfield, Mass.



Two 50,000-Gallon Water Tanks on 70-ft. Steel Substructure.

The M. C. B. Convention.

We continue from page 383 our report of the Master Car Builders' Convention at Alexandria Bay. The subjects to be reported on and the names of committees were printed in full in our issue of week before last, page 374. Therefore we shall not repeat them here.

Our report last week ended with the presentation of the report of the Committee on Interchange. A minority report was presented which we summarize:

MINORITY REPORT ON INTERCHANGE OF CARS.

The majority does not present the subject fully, having considered but one plan of giving relief at interchange points, the plan known as the Chicago agreement. It would seem due to the Association to determine whether the present rules have been wisely used. It may be that a common-sense inspection at interchange points would remedy the evils of rejecting for old defects and of delays.

The majority considers that there is a sentiment in favor of placing the responsibility for repairs on car owners, which is in line with the recommendations of the various railroad clubs. While full consideration is due to such recommendations it is unfair to the Association to accept these practically private recommendations without positive proof and careful investigation.

Finally, the plan recommended is at variance with well established business principles. The essence of the fundamental principle on which the M. C. B. rules have been built up is that the user compensates the owner by the payment of sums sufficient to cover the interest on the principal invested, taxes, insurance, ordinary wear and depreciation. The proposed change abandons this general and equitable principle. As impairment takes place it is proposed that any company shall make the necessary repairs at the cost of the owner or return to him a car in an abnormally worn out condition.

The present mileage rates have been based on cost of repairs. It would not seem proper to adopt a measure which may seriously affect the earnings of cars on foreign roads.

The proposed change allows a company to repair a foreign car and send the bill to the owner who has no means of knowing whether the repairs have been properly made or with proper material. In most cases he would have to take all this for granted, which is a violation of usual business precautions. Altogether, it seems wise to pause and consider whether a change such as is proposed would be judicious.

On motion of Mr. Grieves both the majority and minority committee reports were accepted.

MR. LEADS called attention to the restrictions that are noted in the minority report. We did not consider it necessary to go into any argument of the question in the majority report, but presented merely the result of the inquiries which we made.

MR. BARR: We say that we do not intend to let other people repair our cars. I suppose there is approximately a million dollars' worth of repairs on "bad order" cars floating through this country, so that anybody who feels inclined to make the repairs can do so. If that is not letting other people repair our own cars, I do not know what is. What is the result? Some person five hundred or a thousand miles away repairs a car and repairs it improperly; and it passes along until it reaches the road of the owner. The inspector is familiar with the construction, and says, "We cannot take this car." The result is that the last holder of that car has got to pay the bill. There has been considerable said about the inequity of the plan under consideration. It seems to me there can be nothing more inequitable than the case just cited. We all know of numerous cases in which cars are offered by foreign roads, and they say, "We didn't make these wrong repairs." The answer is, "That dosen't make any difference, M. C. B. rules, you will have to pay for them." Under the arrangement in force any defect which may develop in a car away from home may be repaired without giving notice to the owner. With the new arrangement there is a notice necessary.

MR. MCWOOD: The great trouble with the present rules is want of uniformity. The case cited by Mr. Barr shows exactly where the want of uniformity comes in; with more uniformity there would be far less trouble. The extension of Rule 8, making car owners responsible for old defects, is too broad.

MR. WAITT: The M. C. B. rules undoubedly served a very valuable purpose in connection with the interchange of cars. Adopted a number of years ago, when business was comparatively small, when carding was a new thing, when M. C. B. couplers, air-brakes, etc., were not in existence, they fulfilled their purpose. Now they do not fulfill all the requirements of the service. At all the large interchange points there are special arrangements broadening upon the rules but not in conflict with them. We have an agreement with the Pittsburgh & Lake Erie by which we allow either road to repair cars of the other and make a bill. At Youngstown, the point where we interchange, we stopped our inspection. One man, looking after hot boxes, etc., has since done the work of five or six. By arrangements at several points we agree not to set the cars back. It is necessary to prevent delays to traffic. Why not extend the same principle, as the committee proposes, by all of us agreeing to do this same thing—repair cars when they need it? At Chicago it has worked a wonderful change in reducing defect cards. Worn-out cars will be sent home just the same under this new arrangement. It will induce people not to put poor material in new cars, as they will be responsible for it.

MR. RHODES: There is another question brought up by this subject, why is it that the interchange of cars now becomes so prominent? Why was it not brought up before? It has been felt for a long time that it was not fair to saddle old defects on the railroad that happened to have the car on its hands, and various means have been adopted to cover that ground, but we have never succeeded in covering the ground properly. At the last convention the plan of not issuing any cards at all was proposed, and that old defects should be recognized as such. The resultant discussion and action surprised every one. I voted against the proposition last year. Now, I propose to vote in favor of it. What makes this subject prominent now? It may not be so in the East, everywhere, but in the West heavy loss of business, the way our equipment has been handled, and the unnecessary expense that we are sometimes put to, have made us feel that some action must be taken.

One thing which makes the discussion at this meeting perhaps not as full and square as it ought to be is that many come here and vote according to instructions from superiors. Without any disrespect to the superiors, I do not believe that they are as competent to judge of these details as are the master car builders.

MR. NELSON: Those in the Chicago agreement are enthusiastic about it; principally because they were having so many difficulties there that it was absolutely necessary to adopt something radical. Times come when we must choose between two evils; but I think it has not been in practice long enough to develop such other evils as may come from it, though perhaps not until after it has been in force for some time. I do not think the Association as a whole should adopt this now, since there is not sufficient information as to how it will work over large territory. We may come to this idea ultimately, but I believe there are already indications that the present agreement may be profitably modified. Why not let these roads continue their agreement, and give the Association the value of their experience after it has been in use a longer time, so that we will be better able to judge?

MR. MITCHELL: The New York, Lake Erie & Western Railroad Company was one of the original 12 roads to

enter the Chicago agreement, and the agreement has unquestionably given us relief in Chicago; but I do not believe that we should make the agreement universal until after further experience. It has been in force only a short time, we are constantly disputing, and it will make an immense amount of work for the Arbitration Committee. Let us continue that Chicago agreement for another year, when, it we see fit, the other roads can take it up.

MR. MCKENZIE: The members will agree with me that the rules of to-day are thoroughly impracticable and are not lived up to. In the Buffalo interchange between the New York Central and the Lake Shore and West Shore there are 22 special rules of interchange, supposed to be governed by the M. C. B. rules, and so in other cases. The very fact that it has been found necessary to introduce rules governing interchange at these large interchange points is evidence that the rules are not worth anything as they stand, and should be radically changed. I believe the Chicago interchange agreement is the proper thing. It is said it will increase our clerical force; but where we put on a forty dollar man in the office, we will take off four or five sixty-dollar interchange men.

MR. POTTER: I represent a Chicago road which is not a party to the Chicago agreement. Mr. McKenzie said that it is entirely impracticable to interchange cars under the present rules. I cannot agree with him, since we interchange cars under the rules as they are intended to be used. There are some few exceptions, principally at Chicago. When we receive time-freight from a foreign road, when the inspector is not present, and the car must go through, we will send it on and apply to the representative of the road for a card, and we never fail to get it. There is considerable merit in this new interchange, and it will probably be adopted in a modified form later on. For the present it would be unwise for us to adopt it. We should allow the present rules to prevail for another year.

MR. WADE: The M. C. B. Association should certainly issue rules governing the interchange of cars and they should be lived up to. The M. C. B. rules are not being observed now at one half the interchange points in the country. There must be uniformity in the rules and their observance.

MR. GRIEVES: We know that the Baltimore & Ohio has been benefited by the new interchange at Chicago; and if it is a good thing at the greatest railroad center of the country, we feel that we want to try it at other points, and would like everybody else to go into it and make it a success.

MR. MORRIS: I confess, like Mr. Rhodes, to being a convert to the new system. I voted against it at the last convention. While there are many reasons and figures that I could give, I will simply give a few, which will show the manner in which the cars have been interchanged at our Cincinnati connection during February, March and April, 1894.

Total cars	58,787
Average per month	19,596
Average per day	661

For the same month of the current year, the record is as follows:

Total cars	71,557
Average per month	23,856
Average per day	803

For the months of February, March and April, 1894, out of 167 freight trains arriving at Covington, Ky., yards, a total of 521 freight cars under load were cut out for defects, which were either repaired or transferred to other equipment, which would pass inspector. See statement:

February, cars cut out	174
March, cars cut out	190
April, cars cut out	157
Total defective cars	521

This was out of a total of 167 trains.

For 1895, at the same place with the same class of trains a total of 258 cars under load were cut out, as follows:

February, cars cut out	73
March, cars cut out	105
April, cars cut out	80
Total defective cars	258

MR. GARSTANG: I endorse the sentiments of Mr. McKenzie. The inadequacy of the M. C. B. rules has been clearly demonstrated with our connections at Cincinnati. We tried to handle the business under them, each road employing its own inspectors. We could not get the traffic through. We agreed upon a joint inspector, and still it would not go through. He asked for assistants and we let him have two. The business still did not go through satisfactorily. The joint inspector thought if he got charge of the inspectors he could control the business all right, so we turned them over to him, and still it did not get through. Our principal interchange was with the Chesapeake & Ohio. About that time the Chicago interchange was proposed, and I am happy to say that the "Big Four" was one of the pioneers in the new interchange. In about six months we have reduced our inspecting force at Cincinnati $306 a month, and our superintendent informs me that the Cincinnati yards were never as free as during the past three or four months. Yet the business on our road is about 15 per cent. better than it was last year, and we have handled more in a given time than ever before. The impression that this interchange does not benefit any place but Chicago is a mistake. It benefits us at Cleveland and Cincinnati, and wherever we can find lines that will go into it. We have showed a reduction of 25 per cent. in defect cards issued on the end of the road where we have lines in the new interchange; on the other end the increase has been 15 per cent.

MR. HAYWARD: We have very little friction in interchange with some of the most important railroads in this country, and the old rules are working very well between us. Whether the new rules would work to greater advantage we cannot say. I know very little in regard to the Chicago interchange, and in my conversation with gentlemen connected with the Eastern roads, I find that they are as about as ignorant as myself. Much trouble at interchange points is caused by the peculiarities of the inspectors. It should be carefully considered whether it is absolutely necessary to upset the rules which have for some years been serviceable; but it would probably be advantageous to revise the present rules.

MR. BUSH: The arguments of those in favor of the Chicago interchange show only one idea, namely, the facilitating of the interchange of cars. Some of the ideas involved in, forming our present rules have been overlooked. The framers looked into the matter of equity, and it was their idea to provide certain safeguards. This was the first consideration with them, and the facility of interchange the second. For the latter they provided what is known as the defect card, one safeguard, was to put a premium on the careful handling of the cars. The Chicago interchange tends to throw awa a little too much of these safeguards: it is too radical. The facility of interchange has been most spoken of. I do not think the feeling is general that freight is being detained. There are other arguments in favor of the agreement. The mileage of cars can be increased. The American Railway Association has had under consideration for several years a plan for that very purpose, known as the per diem system. On the face of it the system is just, but they have not adopted it. In reply to a question by Mr. Waitt, Mr. Bush said: We carry out the M. C. B. rules of interchange all over our lines, as far as concerns connections with other roads. Our inspection is according to the rules for safety; and we take care of the cars belonging to other lines, just the same as if it were part of our own system.

MR. MARDEN: The fact that different roads in the North, East and South have concluded to change from the M. C. B. rules is evidence that this movement is not sectional. I understand that the Chicago interchange simply contemplates adding a few more items to rule 8, and making owners responsible for certain other defects. I cannot agree that there is not a demand among our higher officers for a freer movement of cars. I know there is between different roads. Take the Pennsylvania or the New York Central. They will pass from one terminal to another, covering a large territory, without thinking of having their inspectors at divisions work according to the M. C. B. rules. It would result in a congestion of cars and large delays on their own lines. The only objection I have to what is known as the Chicago interchange is that it does not go far enough. I believe that all car owners should be made responsible for all old defects on their cars and that the delivering road should only be made responsible for such damage as occurs on its own road. The time is coming when this convention will include in its rules the repairing of cars by the receiving road, thereby stopping a large amount of switching mileage. The time for high rates in freight and passenger traffic is past. Look through the country and see how many roads are paying dividends. The operating department to-day is working in every way to reduce expenses, and why should not we help them? The prompt movement of rolling stock between interchange points, and the stopping of switching mileage, will add greatly to earnings. I have known shippers to complain bitterly of the delaying of cars, and we have often found that a car has been sent back by an inspector which, if going over the Pennsylvania road, between any of their divisions, would have passed along and should have passed along in the cases alluded to, as far as safety is concerned. The inspector inspected as a precaution that his road might not be a loser.

MR. LEWIS: All of the objections of the minority have, I think, been sentimental, or possibly even mercenary. The change is not so radical as they would have us believe. We certainly are not looking for an opportunity to repair the cars of other companies. I have been very pleased with the first month of my connection with the Chicago interchange. With a foreign mileage of something over 80,000 miles we rendered bills for repairs to foreign cars to the amount of $10, or something over 800 miles for every cent of repairs. We had no expense or breakdowns. I do not see the object of prolonging this trial to find out how it is going to operate; I think we know now. Six months is a fair trial, and it has not yet developed a single defect. The minority have not been able to present a single valid objection to it.

MR. LEEDS: One of the best arguments we have has been made by Mr. Mitchell, that he is not in favor of making a universal application of the rule, although it would relieve other points where we have to get cards that we receive in the interchange. I do not think it is just that the roads should expect us to go on for another year with our new rules, to see whether this thing is a success.

MR. BRONNER: The minority has dwelt on the point that the only advantage we claim for this agreement is the saving of delay, and that they do not see that the country is suffering from delay to any great extent. Our general officers are always after us on account of delays to freight. We have been trying to develop a business in the South through the C., H. & D., one of our conections at Toledo, consisting largely of early fruit and vegetables, which are of a perishable nature. We found that on account of the delays from the operation of the M. C. B. rules at Toledo—although the rules had been greatly modified with the object of taking from them much of their rigor—we could not get the freight through. A committee from the Board of Trade at Cincinnati came up to see our President, and the matter was talked over between the officers of the C., H. & D. and Michigan Central, who evidently knew something of the Chicago agreement, and they instructed the mechanical departments of the two roads to enter upon that agreement. I telegraphed to my foreman to give me the result of the operation of the Chicago agreement at Toledo. The result is as follows:

Week preceding our entering upon agreement, interchange of 254 cars; issued 31 defect cards and received 39 defect cards; placed upon our repair tracks 35 cars of the C., H. & D. It is presumable they repaired as large a number of our own.

First week after the operation of the Chicago interchange, 251 cars interchange; 2 defect cards issued by us, 4 received; repaired 3 of the C., H. & D. cars.

Second week, interchange of 329 cars; issued 1 defect card, received 1; repaired 2 C., H. & D. cars.

MR. CHAMBERLAIN: I think with one or two exceptions that all roads east of the Hudson River will favor the Chicago agreement. I am entirely in favor of the plan.

MR. BARNES: In this minority report there is an important point that has not been discussed yet, on which I would like some information. The last clause reads: "It would seem wise to pause and consider whether it would be judicious to effect a change which may make the owning of cars a source of loss, and attack a policy devised and generally adopted by the responsible managers of railroads." Owners of cars get six mills per mile; and it may be assumed that the repairs are four mills per car mile. Out of that six mills under the present rules of interchange the owners of cars have to pay a certain amount for repairs. We might assume perhaps that not half of that would be added under the new plan.

MR. NELSON: I have no figures, and I do not think that the Chicago agreement has been in use long enough for reliable results. The action taken by the American Railway Association must certainly be based on the present cost of moving cars on foreign roads. Mileage is but ren' for cars. It has been said that the repairs will not be increased. A large increase would certainly disturb the equity of the mileage rate.

MR. ADAMS: The actuating motive of the framers of these rules was protection, and it is still so now, even when we mean to be very liberal. The car builders of the country should take a little broader view than their own particular department. Our present rules in many cases do not meet the requirements, and should be bettered if possible.

MR. PAXTON: Nine-tenths of the trouble with the old rule was caused by arbitrary construction, though since by a more liberal construction the cars passed freely. The only difference is in the construction.

WEDNESDAY'S SESSION.

President Lentz called the meeting to order at 9:20 a. m.

Secretary CLOUD: I have been instructed to say that some friends of the Association wish to honor the ex-Presidents of the Association by presenting them with badges. The gentlemen thus honored are Messrs. I. W. Van Houten, F. D. Adams, M. C. Andrews, William McWood, John Kirby and E. W. Grieves.

The badges were duly presented by the Secretary, and brief responses made by Messrs. Adams, Kirby, McWood and Grieves.

The President declared the report of the Committe on Interchange of Cars to be in order.

On motion the discussion of the rules of interchange and the report of the Arbitration Committee were taken up.

AMENDMENTS TO THE RULES OF INTERCHANGE.

The Arbitration Committee presents a report on the changes of the rules proposed by the various railroad clubs and suggests that a resolution should be adopted by the convention to the effect that the revision of the rules should be made on the basis of making car owners responsible for all the principal repairs existing under fair usage. The committee also recommends that the six railroad clubs form a joint committee, three from each club, these men to be representative members of the Master Car Builders' Association and not members of the Arbitration Committee, these committees forming a committee of 18, to take into consideration the general remodeling of the M. C. B. rules somewhat as proposed by the Southern & South western Club, and to report to the convention in 1896.

On the change in Rule 8, recommended by the Western Railway Club and the Central Railway Club, which we have already printed twice, and the main object of which is to make car owners responsible for repairs to their own cars, the committee concurs, with the exception of Mr. Potter. The committee also, with the exception of Mr Potter, recommends the addition of the following paragraphs to Rule 8: Paragraph k—Switching roads, railroads not forming parts of systems and transfer roads owning less than 500 cars, will not be allowed to render bills under paragraphs b and c, and will be held responsible for all new defects which may be caused while cars are in their possession. The same exceptions will be made for the equipment of these lines which is on roads which is not except from the provisions of paragraphs b and c.

Paragraph l—Bills made under Rules 8 and 9 on the authority of bad-order cards will be outlawed when presented later than three months after the date the repairs were made.

There is a great deal of detail in the report of the

Arbitration Committee, but we have summarized above that which refers especially to the main question involved, namely, the responsibility of owners.

Mr. Rhodes read the report to bottom of page 2.

MR. RHODES: In explanation of the first resolution, the committee desired a test vote before proceeding with the rules in detail; that is a vote by cars. By having a car vote on the question of the Chicago agreement, we will save time afterward in the detail.

An informal vote was suggested.

MR. BARR: I do not favor an informal vote to determine the sentiment of the Association with reference to the change of Rule 8. I move that the resolution here presented by the committee be adopted.

MR. ADAMS: By adopting this resolution do we not certainly place ourselves absolutely in the position that we favor the Chicago interchange?

MR. BARR: Not necessarily.

MR. ADAMS: If that is understood, I should be in favor of this course.

MR. BARR: A correct understanding of this question is necessary. This motion is that the convention signifies its willingness to modify Rule 8, so that car owners are responsible for ordinary wear and tear, and then restrictions under the same rule will not prevent their charging for rough usage. A vote by cars afterwards on each detail will not be necessary.

MR. RHODES: A reading of the preamble and resolution will make the matter a little clearer.

"WHEREAS, A desire for a change in the rules making car owners responsible for all the principal repairs existing under fair usage, has been strongly evidenced, and has been recommended in the reports from the New England Railroad Club, the New York Railroad Club, the Central Railway Club, the Western Railway Club, and the Southern and Southwestern Railway Club; therefore, be it

Resolved, That the revision of the rules at this convention shall be on this basis, and shall be provided for mainly by additions to Rule No. 8."

Those who favor the new revision ought to vote in favor of this resolution.

MR. MARSHALL: I believe there is an almost unanimous sentiment in favor of a revision of the rules, relieving us of much of the carding that is being done, and relieving the congestion of traffic, etc. Many also are not ready to accept the Chicago agreement, but are ready for a modification in the present rule. Possibly some middle course may be suggested.

MR. SANDERSON: If this resolution prevails are the different clauses of the recommendation of the Arbitration Committee to come up?

MR. RHODES: That will be done as usual. We hope by a test vote to obtain the feeling of the members toward this resolution. Afterwards the different clauses will be taken up.

MR. MARSHALL: If there are not two-thirds in favor of the resolution we will then take up the rules, one by one, as the Arbitration Committee presents their recommendations. It is a test of the strength of the convention in favor of the Chicago agreement.

MR. SOULE: Mr. President, I move an amendment to the original motion to the effect that the vote on that motion shall not restrict the debate which may follow, and not commit this Association in any way in regard to subsequent action in reference to the rules. (Carried.)

The vote was then taken with the following result:

In favor	666
Opposed	458

(Motion lost.)

Resolved, That the Executive Committee of the Association be instructed to request the Secretaries of the various Railway Clubs to have a committee of three representative members of the Master Car Builders' Association appointed from each of the six Railway Clubs, the committee of eighteen so appointed to take into consideration the general remodeling of the Master Car Builders' rules somewhat as proposed by the Southern and Southwestern Railway Club, and that the committees shall report the result of its deliberations to the Arbitration Committee to be submitted to the convention of 1896 in its annual report. Members of the Arbitration Committee are not to be eligible as members of the joint committee of the railway clubs.

The motion was put and carried.

On motion the Secretary read the rules.

Rule 1.—The amendment proposed by the Committee on Interchange of Cars by inserting the words "and minor repair" after the word "packing" was adopted, on motion of Mr. Marsh. The rule was adopted as amended.

Rules 2, 3, 4, 5, and 6 were adopted without amendment.

Rule 7.—The committee proposed an amendment to this rule to make it read "Locks, grain doors and inside parts of cars are at owner's risk, except where damaged by wreck or unfair usage."

Rule adopted as amended.

Rule 8.

MR. RHODES: The recommendation of the Arbitration Committee which has been practically disposed of by the original motion, and unless the convention wishes it, it seems unnecessary to read it.

MR. SIMONS: I move that section (d) of the rule be amended by adding after the words "body bolsters" the words "end sills."

MR. SANDERSON: Truck center plates should also be included. Truck center plates are broken by weak bolsters, for which the owners are responsible. Sprung bolsters cause most of the broken center plates.

MR. WADE: "Draft springs" should be included.

Section (d) was adopted as amended, viz.: Truck or body bolsters, end sills, center plates, draft springs, truck transoms, spring planks, or truck springs broken or lost, or arch bars broken or cracked, providing the car was not derailed or wrecked.

MR. SANDERSON: I move to add a section (i) "Cars not within the standard limit of draw bar height." The United States law will require cars to be of a certain height in this respect, and we will be responsible if we handle cars not within the standard limit of height. No one but the owner should be held responsible for the cars being too low; and, to facilitate business, roads having those cars on their hands should have the privilege of repairing them, and charging the repairs to the owner.

MR. WAITT: I would like to add "grab-irons and hand-holds," which the law requires.

MR. ADAMS: I want to know if the road is not responsible to the Government. Each road should be responsible if its cars are not in accordance with the law.

MR. MITCHELL: We had cars built six months ago which were right when new, and are below the limit already. Cars with weak springs are liable to go down. I do not think that every road should be allowed to brace these cars up, but that they should be blocked up when they get home.

MR. BARR: Can some one give a definite statement of what that law is?

An article by Edward A. Moseley, Secretary of the Interstate Commerce Commission, explicitly defining the position which will be taken in reference to the law which goes into effect on July 1, was read. The substance appears in the *Railroad Gazette* page 367, June 7.

MR. HIGGINS: The Lehigh Valley road sometime ago arranged a standard plan for bringing our cars to a proper height. We also adopted standards for grab-handlers, standard location and design. We certainly would object to other roads raising our cars as they see fit, and also to supply grab-handles different in shape and location from what we have.

MR. BARR: Any car that does not comply with the requirements of the law will have to stand in the yard until it is made to comply with them. We subject ourselves to a fine of $100 for each car we attempt to move that is not up to the requirements; it does not matter whose car it is. The rules which we adopt do not go into effect until Sept. 1. Something must be done at once. I think the convention ought to vote unanimously that on July 1 we adopt a special rule authorizing us to make these repairs at the expense of owners, and to raise cars to the height required and supply grab-handles on those needing them.

Section (i) was then adopted as follows: "Cars with drawbars not within the limits of standard height, or cars without grab-irons or hand-holds, as required by law."

Mr. West moved that the Arbitration Committee fix the price for this work. (Carried.)

MR. BARR: I move the adoption of a rule to go into effect July 1, that any cars which do not comply with the requirement of the law as to height of drawbar or as to equipment with hand-holds or grab-irons may be repaired wherever found, at the expense of the owners, at a uniform price, to be fixed by the Arbitration Committee, and that the secretary shall give notice as soon as possible to all members. (Carried.)

The Arbitration Committee reported that they had considered the matter of prices to be charged under the foregoing special rule, and recommended that .50 cts. be charged for raising each end of a car and .20 cts. be charged for each grab-iron applied.

Rule 9.

The Central Railway Club recommended that the rule be amended as follows: "(b) axles bent or broken, or with collars broken or worn off under fair usuage." (Adopted.)

No change made in rules 10 and 11.

Rule. 12.

The Western Railway Club recommends changing the table of prices to read as follows:

	New	Second-hand.	Scrap.
One 36-inch wheel	$8 00	$6.00	$4.00
One 33-inch wheel	6.50	5.00	3 00
One 30-inch wheel (or less)	6.00	4.00	2 75
One axle, 60,000 lbs	8.00	5.00	3.50
One axle, 40,000 lbs. (or under)	7.00	4 50	3.00

(Adopted.)

Mr. Waitt moved the adoption of the following, in place of the last eight lines of rule 12: "In case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged." (Adopted.)

No change was made in rules 13, 14 or 15.

Rule 16.

The recommendation of the Western and Central Railway clubs to omit the last eight words, "including a wrong drawbar in the latter case," was adopted.

No change was made in rule 17.

Rule 18.

The Western Railway Club recommended to amend the last sentence of the last paragraph to read as follows: "The splicing of two adjacent sills at the same end of the car, or *any sill* between cross-tie timbers, will not be allowed." (Adopted.)

No change was made in rules 19, 20, 21 or 22.

Rule 23.

The Western Railway Club recommends to make the price table for trucks read as follows:

With wood transoms, one pair, including brake beams and brake levers	$200
With metal transoms one pair, including brake beams and brake levers	250

The Arbitration Committee concurs in this recommendation, with the addition that it suggests including brake beams complete, truck levers and bottom connection rod.

No change was made in rules 24 or 25.

Mr. West made a motion to limit time of cards, but after discussion by Mr. Rhodes, who pointed out the failure of a previous attempt to do the same thing, it was lost.

On motion of Mr. McKenzie the prices presented by the Arbitration Committee were referred to a special committee, to be appointed by the President, to report at a later session.

On motion of Mr Morris the schedule of hours presented by the Committee for doing work in repairs to cars was adopted.

The President announced the Committee on Prices for materials to be as follows: Messrs. J. T. Chamberlain, R. P. C. Sanderson, John Hodge, Albert Childs and Benjamin Welch.

No change was made in rules 27, 28, 29, 30 and 31.

The President announced that the following gentlemen had been nominated as officers for the ensuing year:

President, John S. Lentz; *First Vice-President*, S. A. Crone; *Second Vice-President*, E. D. Bronner; *Third Vice-President*, J. C. Barber; *Treasurer*, G. W. Demarest; new members of the *Executive Committee*, R. H. Soule, H. S. Hayward, A. E. Mitchell.

THURSDAY'S MEETING.

Vice-President Bronner called the meeting to order at 9:20 a. m.

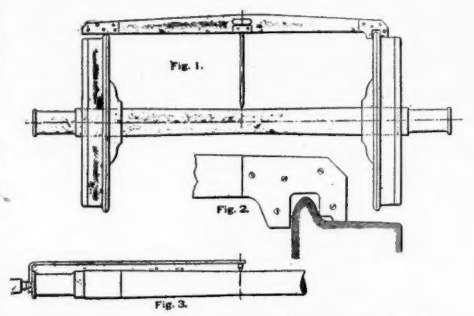
The first report taken up was that on "Mounting New and Second-Hand Wheels."

MOUNTING NEW AND SECOND-HAND WHEELS.

The following recommendations were offered by the committee:

1st. It recommends that a gage for determining the center of the axle, as shown in Fig. 3, be used and that all axles be centered prior to mounting.

2d. That a gage, as shown in Fig. 1, be used for locating the first wheel, mounted properly with reference to the center of the axle.



In the drawings presented Fig. 2 gives a view of the end of the gage, which is drawn to the same lines as the flange gage adopted by the Master Car Builders' Association.

3d. In mounting second-hand wheels, the committee recommends that if flanges are worn to not less than 1¼ in. in thickness, they shall be mounted as new wheels.

If the flanges are worn to less than 1¼ in. in thickness, they shall be mounted so that the gage between flanges measures 4 ft. 5½ in., instead of the standard, 4 ft. 5⅝ in.

It is the opinion of the committee that all practical results will be obtained in mounting second-hand wheels in this way, and that an attempt to work closer than this would simply result in an elaboration of precaution and measurements that would never be carried out.

The committee also recommends that wheels with flanges worn to a thickness of 1⅛ in. should not be remounted.

It is thought, in view of the previous report which was made on the subject of mounting wheels, that it is unnecessary to go any further into detail on this subject.

Your committee, in presenting the above, has based its conclusions entirely on cast-iron wheels. As steel-tired wheels enter the question to quite an important extent, and as steel flanges are not as liable as cast-iron flanges to break off, this committee recommends (Mr. McConnell excepted), that the limit of thickness of flange of steel-tired wheels be made ⅞ in. instead of 1 in., the present limit for cast-iron wheels, and that wheels with flanges less than 1 in. be remounted so that the gage between flanges measures 4 ft. 5¾ in., instead of 4 ft. 5⅝ in.

Mr. Potter, of the committee, read the report.

On motion of Mr. Marshall the gages recommended in the first and second paragraphs of the report are to be submitted to letter ballot for adoption.

MR. WAITT: One of the points to be considered carefully is the end of the check gage, Fig. 2, which is exactly the shape adopted last year. This check gage is applicable to new wheels, but with a flange worn sharp, not the measuring point, $\frac{1}{64}$ above the tread of the wheel, but the projecting point, $\frac{7}{16}$-in. further out, comes in contact with the flange of the wheel, thus admitting a wheel if the flange was worn out to 4 ft. $6\frac{1}{16}$ in., instead of 4 ft. 6¾ in. which we have adopted. We ought to correct that.

The Committee from the Pennsylvania Railroad last year, whose report was included in the report of the Committee on Wheel Gages, showed a shape of check gage where the measuring point was really a point. That form of gage was all right and measured at the point intended. As that point would naturally wear off, the committee enlarged it by extending it upward for ⅛ in. on ⅝ radius, and that threw it out for measuring worn wheels. Had the radius been thrown down-

ward 1/8 in. that would have obtained a correct bearing point. It is important that the matter should be referred to a committee for its consideration as to the advisability of making a change.

MR. MARSHALL: Inasmuch as this association has presented this gage to the American Railway Association as its standard, and now have a committee in consulation with the committees from the American Railway Association and the Roadmasters' Association considering that gage in connection with a proposed standard track gage, it might be unfortunate to change the standard wheel gage, except for use in interchange. I think action in regard to a standard wheel gage should be deferred.

MR. WAITT: It is not proposed to change the gage, but merely the point, making no difference in the measurement, but permitting its use on old wheels as well as new. It is not desired to decide the matter now, but it should be referred to a committee to report next year.

MR. BARR: Is the gage unfit for proper use in interchange on worn flanges, or in remounting worn flange wheels?

MR. WAITT: Both cases. On wheels in the yard it worked very well; but with the flange worn the measurement was 1/16 of an inch too much.

MR. BARNES: This seems to be a small difference of measurement, as the axles, when loaded, spring enough to bring the wheels a quarter of an inch nearer together. This variation is of much more importance than the slight difference in the measurements of the shape of this gage.

On motion of Mr. Mitchell the matter was referred to the committee in conference with the American Railway Association.

MR. WAITT: Another point about adopting a check gage of 4 ft. 6⅜ in., is that our present standard distance between wheels for mounting is 4 ft. 5⅝ in. which, added to the maximum flange thickness of 1⅞ in., varies from the check gage by 1/8 in. Our standards are inconsistent. The committee has recommended a practice in mounting the wheels, having three different distances between flanges, according as they are new, worn slightly, or worn a good deal. By mounting all wheels 4 ft. 5¼ in. between the flanges, there will never be any impingement on the frog; and will be consistent with the 4 ft. 6⅜ in. gage. This matter of making our wheel gages consistent with each other ought to have more practical consideration. I move that the matter in regard to wheel gages be referred back to the committee for further consideration and report another year.

On motion of Mr. Waitt this matter was referred to such committee as the Executive Committee selected to report at the next meeting.

The rules of interchange were then taken up.

Rule 3.

MR. SANDERSON: I move the insertion of the following paragraph (r 1): "Out of gage, or wheels that measure less than 4 ft. 5¼ in. or more than 4 ft. 5⅝ in. between flanges, or less than 5 ft. 5 in. over treads (See Fig. 6 a). This does not apply to wheels cast prior to Sept. 1, 1894." Make a new Fig. 6 a, similar to Fig. 6, corresponding to the rule as changed. Measurements in both cases, as shown on Fig. 6 and 6 a to be made on the same height of the wheel as the center of the axle.

After some discussion the subject was deferred until Friday morning.

MR. WAITT: I think it would be wise to reconsider one of our votes yesterday—that relating to the price of M. C. B. couplers. It seems to me it would be unfortunate for the Association to go before the country advocating a price as a standard price for a M. C. B. coupler, which is known to be below the lowest price at which such couplers have ever been quoted. It would be an unfortunate thing for roads to take it in hand to buy the cheapest kind of couplers to replace those broken or to refuse to receive cars carded for couplers, and to feel that they would only get $8.50 for a coupler which might be worth $10.00. I move to reconsider the vote of yesterday with regard to the price of couplers. (Carried.)

MR. WAITT: I now move that the following prices be adopted: One malleable or steel coupler complete, as furnished by the manufacturers, $9.50; one malleable or steel drawbar casting, replaced, $5; one cast-steel or wrought-iron knuckle, replaced, $1.50. This is a material charge; not for labor.

This motion, amended by Mr. Sanderson by adding after the word "replaced" the words "including the labor," was carried.

On motion of Mr. Simons the vote on rule 23 was reconsidered.

MR. SIMONS: I move that on page 29 we insert this sentence, "For cars equipped with permanent coke racks $15."

MR. WAITT: I move an amendment, to make it read "permanent coke or barrel racks."

MR. GRIEVES: It seems to me $15 is about half the price of a coke rack. I understand the racks adopted by the Pennsylvania Company and the West Virginia Company cost about $36.

MR. SIMONS: We have cars permanently equipped with coke racks, and it costs us $22 to put them on; but as there are other cheaper coke racks in service, $15 is an equitable price; but I am willing to make it $20.

MR. MARDEN: I have no objection to putting this into rule 23, but there is danger of extending this thing indefinitely.

MR. BARR: We have four or five thousand flat cars built with temporary sides for hauling coal, which cost about $10 for the sides. We have no difficulty in collecting under the last clause of rule 23—"Refrigerator cars, special stock cars and other freight cars designed for special purposes, not specially referred to above, shall be settled for at the present cost price," etc.

MR. POTTER: We have many of the cars in our equipment with the expensive coke racks spoken of by Mr. Grieves. They cost $30 to $35. We have quite a number of cars with less expensive racks, costing probably one-half the amount. I do not think it would be advisable to put an arbitrary price on the racks, as I feel the last clause in rule 23 will cover the case.

On motion of Mr. Chamberlain the motion was laid on the table.

The special committee on prices under rule 26 reported the schedule with a few changes.

On motion of Mr. Marshall the changes recommended by the committee were adopted.

The report of the committee on prices for labor was presented, and accepted on motion of Mr. Barr.

On motion of Mr. Waitt, the price of wheels under passenger cars was made to conform with what has been adopted for freight rules. A motion fixing the price of nails at two cents a pound was also carried.

A letter was read from the National Car Inspectors' Association concerning car stenciling and its recommendation was referred to a special committee composed of Messrs. Waitt, Higgins and Hayward.

A motion was adopted to add to the committee of 18, whose appointment was moved on Wednesday, three additional members of the association, to represent and be named by private car lines, the committee to take into consideration the remodeling of the interchange rules, and consider and report to the arbitration committee any desired changes in them.

The report of the committee on Road Tests of Brake Shoes was then read by Mr Soule.

ROAD TESTS OF BRAKE SHOES.

The following railroads, representing 7 of the 12 embraced in the original general committee, have conducted a series of service tests of brake shoes: The Fitchburg; Chicago, Burlington & Northern; Chicago, Burlington & Quincy; Chesapeake & Ohio; Lake Shore & Michigan Southern; New York, Lake Erie & Western, and the Norfolk & Western.

Each car under test had one truck equipped with soft cast iron brake shoes, the other truck of each car being equipped with some one of the 13 different kinds of special brake shoes included in the test. The soft iron shoes were used as standards to which to refer the other shoes tested.

The original intention of calibrating the brake beam release springs under each car used was abandoned, since the number of shoes tested was great enough to give fair average results. The question of brake leverages was disregarded upon the assumption that on every car used the leverages and brake beam pressures were the same on both trucks.

Of all shoes tested 332 were used on cast iron wheels and 236 on steel tired wheels. The service cost of the shoes tested was worked out by determining the actual net cost of the metal worn off. The method followed was to take the weight and cost of one shoe new and the weight and value of one shoe as scrapped, the difference in weight representing metal worn off in service, the difference in value representing the net cost of such metal, from which the net cost per pound of metal worn off is directly determined. Herewith are tables of shoes used and of the cost of each variety of brake shoe relatively to the net cost of soft cast iron brake shoes for the same service, the results upon cast iron and steel-tired wheels being shown separately.

STATEMENT OF BRAKE SHOES USED IN SERVICE TESTS.

	Kind of Shoe.	Made by	No of Shoes on Cast Iron Wheels.	No. of Shoes on Steel-Tired Wheels.	Total No. of Shoes used in Test.	Weight of one Shoe. New.	Weight of one Shoe. Worn.	Net cost of metal worn per shoe.
						Lbs.	Lbs.	Cents.
A.	Soft cast iron	Pennsylvania R. R. Co	Enough to wear out all the others			22.0	12 0	25.0
B.	Hard cast iron	Ramapo Wheel & Foundry Co.	24	16	40	22 5	12.5	35 2
C.	Soft open hearth steel	Solid Steel Co.	28	20	48	23.0	13.0	99.5
D.	Hard open hearth steel	Solid Steel Co.	28	20	48	23.0	13.0	99.5
E.	Malleable iron	Dayton Malleable Iron Co.	28	16	44	22.6	12.6	29.8
F.	Special S. T. malleable iron	Dayton Malleable Iron Co.	24	20	44	22.6	12.6	29.8
G.	Special C. W. malleable iron.	Dayton Malleable Iron Co.	28	16	44	22.6	12.6	29.8
H.	Congdon	The Sargent Co	28	12	40	22.2	12.2	37.4
I.	Meehan	The Sargent Co	28	20	48	22 2	12.2	81.8
J.	Lappin	Lappin Brake Shoe Co.	24	24	48	23.3	13.3	72.0
K.	Safety	Safety Brake Shoe Co.	24	20	44	19.1	9.1	33.2
L.	Soft steel (pressed)	Schoen Manufacturing Co.	24	20	44	20.0	10 0	56 3
M.	Wrought iron (pressed)	Schoen Manufacturing Co.	16	16	32	19.5	9.5	55.0
N.	Sargent special	The Sargent Co	28	16	44	22.8	12.8	61.4
	Total (except the "A" soft cast-iron shoes)		332	236	568			

RESULTS ON CHILLED CAST-IRON WHEELS.

Kind of shoe.	Wear by wt. rel. to soft cast iron for same service.	Net cost per lb. of metal worn, in cents.	Relative cost for same service, in cents.	Cost rel. to soft cast iron for same service.	Remarks.
A.	1.00	2.08	2.08	1.00	
B.	.86	2.81	2.41	1.16	Wear irregular.
C.	.17	7 65	1 30	.62	Wear irregular.
D.	.10	7.65	.76	.36	Worn out.
E.	.53	2.37	1.25	.60	Worn out.
F.	.85	2.37	1.97	.94	Worn out.
G.	.83	2.37	1.97	.94	Wear irregular.
H.	.51	3.06	.95	.45	Wear irregular.
I.	.31	6.70	2 08	1.00	Wear irregular.
J.	.55	5.41	2.98	1.43	Wear irregular.
K.	.70	3.65	2.56	1.23	Wear irregular and plugs fell out.
L.	.11	5.63	.62	.30	Cut surface of wheel.
M.	.11	5.78	.64	.31	Worn out.
N.	.22	4.80	1.06	.51	Metal pieces fell out and broke.

RESULTS ON STEEL-TIRED WHEELS.

Kind of shoe.	Wear by wt. rel to soft cast iron for same service.	Net cost per lb. of metal worn, in cents.	Relative cost for same service, in cents.	Cost rel. to soft cast iron for same service.	Remarks.
A.	1.00	2.08	2.08	1.00	
B.	1.06	2 81	2 98	1.43	Worn out.
C.	.42	7.65	3.21	1.54	Very hard on tires.
D.	.31	7.65	2.37	1.14	Tires very badly worn.
E.	.51	2 37	1·21	.58	Worn out.
F.	.67	2 37	1.59	.76	Worn out.
G.	.81	2.37	1.92	.92	Wear irregular.
H.	.30	3.06	.92	.44	Worn out.
I.	.21	6.70	1.41	.68	Worn out.
J.	.35	5.41	1.90	.91	Wear irregular.
K.	.77	3.65	2 81	1.35	Shoes cracked and plugs fell out.
L.	.29	5.63	1.63	.78	Cut the tires very badly
M.	.29	5.78	1.68	.81	Wear irregular and very hard on tires.
N.	.33	4.80	1.58	.76	Metal pieces fell out and wear irregular.

MR. WAITT: I move that this report be received and the committee discharged, and discussion deferred until after the reading of the report of the Laboratory Test Committee. (Carried.)

MR. BARNES: I offer this resolution: Resolved, that it is the sense of this meeting that suggestions from technical associations of railroad mechanics, as well as the Air-Brake Men's Association, as to changing of standards, recommended practice, and subjects for investigation, are agreeable to this association, and will be considered by the Executive Committee and presented to this association in convention if found advisable. (Carried.)

The report of the Committee on Laboratory Test of Brake Shoes was then read by Mr. Bush.

LABORATORY TEST OF BRAKE SHOES.

The committee makes a long report, the tables and diagrams from which we reprint. The apparatus used has already been described. After the convention of last year various difficulties arose. The principal one was that of avoiding the violent fluctuations of pull on the pull rod, which was finally made possible. An electric speed and time recording apparatus was advised to be used with the Boyer recorder, and the machine was made to drive the record paper from the shaft of the fly wheel, the motion being reduced in the ratio of 802.04 to 1. so that the length of the diagrams became the measure of the distance traveled in making a test corresponding to a stop.

A mass of metal in the form of a fly wheel on a shaft, having a weight equivalent to 11,995 lbs. moving in a straight line and capable of being driven up to any speed, was provided to represent the maximum weight carried on one journal of the car. A wheel mounted on one end of this fly wheel shaft represented the car wheel in service. The shoes were forced against this wheel by weights and levers. After the wheel had been brought up to the required speed the engine was shut off and disconnected, the brake-shoe applied and the mass brought to rest.

The 14 shoes selected for test are lettered as in the tests of the Road Committee, and were designated as below:

A.—Soft cast iron, made by the Pennsylvania Railroad Co., F. D. Casanave, General Superintendent Motive Power, Altoona, Pa.

B.—Hard cast iron, made by the Ramapo Wheel & Foundry Co., Ramapo, N. Y.

C.—Soft open hearth steel, made by the Solid Steel Co., Alliance, O.

D.—Hard open hearth steel, made by the Solid Steel Co., Alliance, O.

E.—Malleable iron, made by the Dayton Malleable Iron Co., Dayton, O.

F.—Special S. T. malleable iron, made by the Dayton Malleable Iron Co., Dayton, O.

G.—Special C. W. malleable iron, made by the Dayton Malleable Iron Co., Dayton, O.

H.—The Congdon Shoe, made by the Sargent Co., Fifty-ninth and Wallace streets, Chicago, Ill.

I.—The Meehan Shoe, made by the Sargent Co., Fifty-ninth and Wallace streets, Chicago, Ill.

J.—The Lappin Shoe, made by the Lappin Brake Shoe Co., No. 18 Broadway, New York City.

K.—The Safety Shoe, made by the Safety Brake Shoe Co., 620 Atlantic avenue, Boston, Mass.

L.—Soft steel (pressed), made by the Schoen Manufacturing Co., Pittsburgh, Pa.

M.—Wrought iron (pressed), made by the Shoen Manufacturing Co., Pittsburgh, Pa.

N.—The Sargent Special Shoe, made by the Sargent Co., Fifty-ninth and Wallace streets, Chicago, Ill.

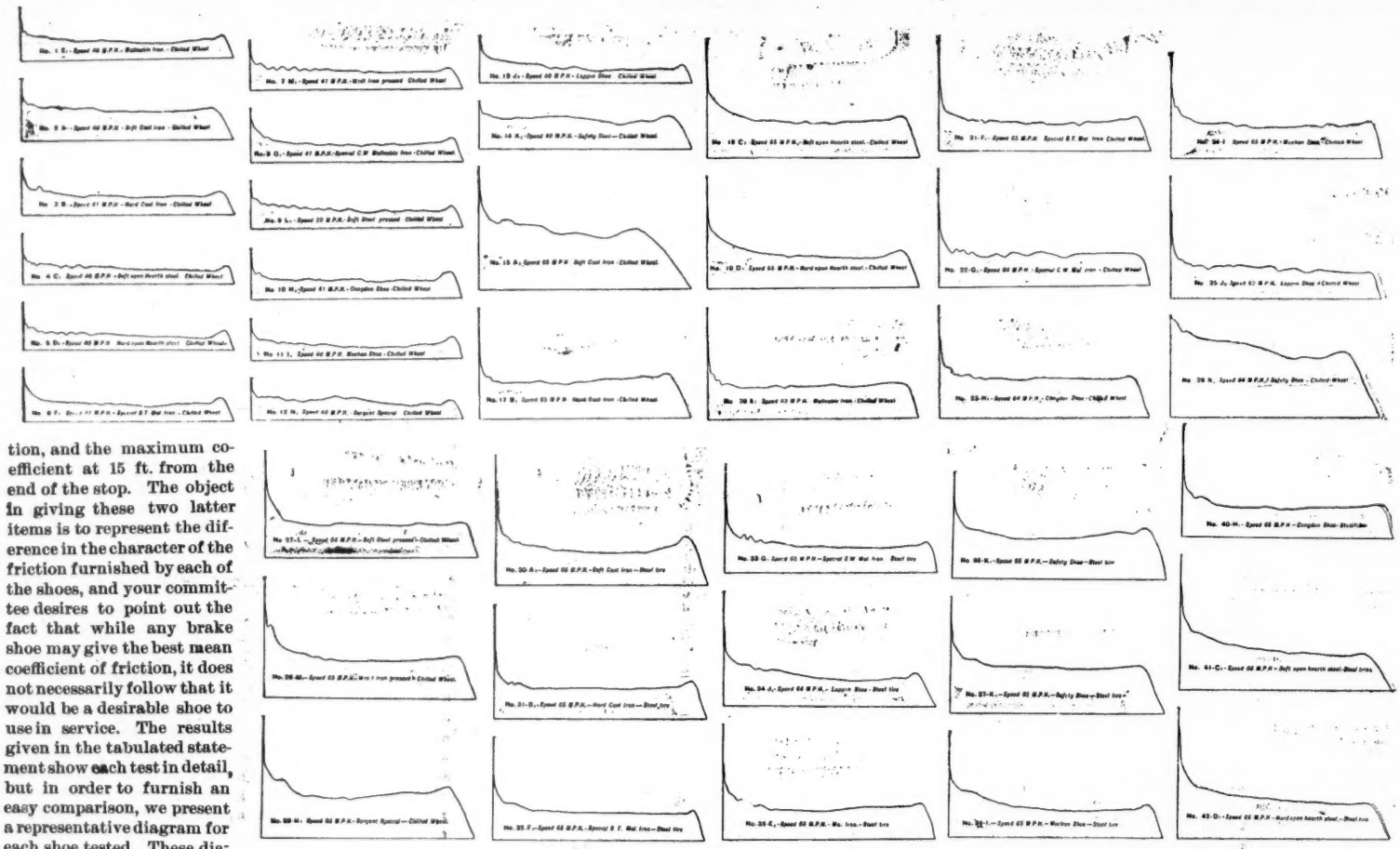
In order to test these shoes under the most severe conditions generally prevailing in freight and passenger service, the following was decided upon:

1. Freight service. Chilled cast-iron wheel. Brake-shoe pressure 2,793 lbs., corresponding approximately to 70 per cent. of ⅓ of the light weight of the heaviest 60,000 lbs. capacity car. Speed, 40 miles per hour.
2. Passenger service. Chilled cast-iron wheel. Brake-shoe pressure 10,713 lbs., corresponding approximately to 90 per cent. of the weight on one journal of any one passenger coach, sleeping, dining or other car that may be hauled in passenger trains. Speed, 60 miles per hour.
3. Passenger service. Steel tired wheel. Brake-shoe pressure same as above (No. 2). Speed, 60 miles per hour.

The brake shoes were all turned and ground to the wheel and five tests of each shoe were made under all of the conditions.

It will be understood that the result to be obtained in making these laboratory tests was to determine the character and intensity of the friction given by the brake shoes above mentioned.

The term "Coefficient of Friction" as used in the tabulated statement, is the relation of the total friction between two surfaces to the force pressing the surfaces together; in other words it is the proportion which the pull on a brake beam hanger bears to the force with which the brake shoe is pressed against the wheel. For instance, where the coefficient of friction is shown as 20, it is meant that the pull on the brake hanger, or the retarding power of the brake shoe measured in pounds, is 20 per cent. of the force applied to the brake shoe through the brake beam. In the tabulated statement, in addition to the mean coefficient of friction given, is also shown the maximum coefficient at the beginning of the application, and the maximum coefficient at 15 ft. from the end of the stop. The object in giving these two latter items is to represent the difference in the character of the friction furnished by each of the shoes, and your committee desires to point out the fact that while any brake shoe may give the best mean coefficient of friction, it does not necessarily follow that it would be a desirable shoe to use in service. The results given in the tabulated statement show each test in detail, but in order to furnish an easy comparison, we present a representative diagram for each shoe tested. These diagrams have been made by reducing the actual representative diagram selected to a length of 4 in., so that it is a somewhat conventionalized representation of the real diagram, and serves to show only the relative friction of different shoes by the height of the diagram line from the base line, and does not show the variation in the length of the stop, resulting from greater or less friction, which the original diagram shows.



Diagrams with Report of M. C. B. Committee on Laboratory Test of Brake Shoes.

In analyzing the results it will therefore be observed that the prevailing practice in the United States in the matter of brake shoes for freight service, namely that of cast iron, is, generally speaking, not far from the best yet known. The shoe K-2, it will be seen, compares very favorably with soft cast iron, but for reasons shown by the note on the test of this shoe, to be presented later, it is hardly practicable for use in its present form.

In the case of the passenger tests with a chilled cast-iron wheel, cast-iron shoes give the best, or among the best, coefficients.

In the case of the passenger tests with a steel-tired wheel, the relation is somewhat changed, steel and wrought-iron shoes giving the highest coefficients.

The following notes taken after each test of the different shoes are presented to show the characteristics and incidents that could not be shown otherwise, from which it will be seen that in some cases the characteristics were such as to operate much to the disadvantage of some of the shoes that gave the highest friction coefficients.

FREIGHT TESTS.

In the case of all the shoes, excepting H, I and K, the surfaces were found to have a good bearing, sustaining no injury, neither were there any marked peculiarities of surface.

In the case of shoes H and I, the wrought iron and steel insets flowed slightly, partially covering up the cast iron parts of the shoes.

Shoe K, it will be seen from the diagrams, gave a more uniform friction than any of the others, and it did not give the sudden rise at the end of the stop. It is a question how much of this was due to the wooden insets, and how much to the very soft iron of which the shoe was made.

There was no wear of the wheel after any of the shoes had been tested, although the surface was a trifle rough, due to small particles from the various shoes sticking to the tread; these, however, were easily scraped off. At no time was the wheel so hot that the hand could not be held on it without discomfort, although the shoes, in some cases, heated considerably, but not enough, it was thought, to affect their retarding power.

PASSENGER TESTS, CAST-IRON WHEEL.

All of the shoes were fitted to the wheel accurately before commencing these tests.

After the tests it was found that shoes A, B, E, F, G, J and K did not have a full bearing at the ends, about 85 per cent. of the total surface only having a bearing on the wheel. This was undoubtedly due to the intense heat generated by friction, which expanded the surface of the shoe in contact with the wheel and had a tendency to straighten it out, and thus make the bearing surface smaller. All of these shoes became red hot for a distance of about ⅛ in. up from the tread of the wheel during a single test, and from 20 to 30 minutes were required to cool them down with an air blast. The wheel also became warm, and after every five tests was allowed to cool down to nearly its normal temperature. Shoes A and B showed no other peculiarities than those above mentioned.

In the case of shoe C, the metal flowed under the intense heat and pressure, and the particles were carried to the end of the shoe which was last in contact with the wheel, where they piled up, partly fusing together.

Shoe D had peculiarities very much the same as shoe C, but not quite so marked.

With shoe H, the wrought-iron insets flowed over the cast-iron in flakes about .02 in. thick, separating the cast-iron from the wheel and reducing the area of contact of the shoe about 25 per cent. The shoe heated somewhat more than in the case of cast-iron and malleable iron.

In the case of shoe I the steel insets flowed in the same manner as with shoe H, but to a greater extent, although the area of contact was about the same.

Shoe J, which was of chilled cast-iron, became red hot during the test, and lost its chill entirely. After the tests, and the shoe had been cooled off, the face of the shoe could be cut easily with a file while before the tests an emery wheel was required to cut the surface. After the chill has been removed the shoes might be expected to give the same results as hard cast iron.

Shoe K was composed of very soft cast iron, fitted with wooden insets 1⅛ in. in diameter. These insets reduced the cross-section of the cast-iron part of the shoe 49.4 per cent. which, combined with the softness of the iron, made it very liable to break. A crack appeared during the test of this shoe, which increased with each application of the brake, and at the end was so large that a light blow of a hand hammer broke the shoe in the middle where the crack was. The heat charred the plugs badly around the edges, and after this had taken place they did not present their entire section to the tread of the wheel; they also worked loose, and in practice would no doubt be liable to drop out when the shoe had been worn to about one-half its thickness.

Shoe L, soft pressed steel. The metal in this shoe flowed, but not to the same extent as with shoes C and E. It presented its full surface to the wheel both before and after the tests.

Shoe M, wrought iron. The metal flowed somewhat more than in the case of shoe L but not so much as in the cases of shoes C and E. It presented a full bearing to the wheel after the tests.

Shoe N was composed of cast iron, with chilled iron insets, which were loose in the body of the shoe. These insets reduced the section of the cast iron about 56 per cent. It gave no marked peculiarities.

PASSENGER TESTS, STEEL-TIRED WHEEL.

In these tests all of the shoes became much hotter than with the cast-iron wheel, although there was but little difference in the temperature of the two wheels.

In the case of shoes A, B, E, F, G and J the characteristics were very much the same, the iron in all of them was torn off in flakes varying in size from ⅛ sq. in. to ½ sq. in., and in thickness from .0015 in. to .002 in. The largest flakes came from shoes E, F and G, and the smallest from shoe B, varying with the hardness and toughness of the different irons.

Shoes C and D, soft and hard steel, respectively, gave results similar to when tested with the cast-iron wheel, but more marked; and in addition, when the metal flowed it piled up in a very peculiar manner, preventing contact with the wheel at the end of the shoe last in contact with it. When these shoes were examined at the end of the tests, only about 70 per cent. of their surfaces were in contact with the tread of the wheel.

Shoes H and I gave about the same results as with the cast-iron wheel, excepting that the metal flowed somewhat more and covered more of the cast-iron surface.

Shoe K broke during the second test. Another one was substituted, and this cracked so badly after the second test that it was broken with a hand hammer. This shoe, it will be observed, gave a diagram very different from the other shoes. The friction was the highest of all at the beginning of the stop, and at the end did not increase so rapidly. The excessive vibrations, or jerks on the pull rod, also did not occur. These latter characteristics are good ones, but it is not certain whether these are due to the wooden plugs or the softness of the iron.

Owing to the tests of shoes L, M and N not having been completed the committee is not able to introduce notes covering them in this advance report.

While the friction of the various shoes when used in connection with the steel-tired wheel was greater than in the case of the cast iron, as might be expected, the steel-tired wheel showed slight signs of wear in all cases. However, the wear of the wheel was not enough to be measured in any way.

One very significant fact is presented by the results of these tests, namely that the coefficient of friction, or retarding power, of brake shoes is greatly reduced under the conditions existing in passenger service, corresponding to the passenger tests. While the brake shoe pressure in the case of the latter was increased nearly 300 per cent. and the speed about 60 per cent., the coefficient of friction up to within a few feet of the end of the stops decreased about 50 per cent. This presents a higher condition which indicates that considerable further information is required.

In the report presented by the committee last year, it was suggested that in addition to determining the relative values of the different brake shoes when subjected to the ordinary conditions of service, much additional and exceedingly valuable information might be obtained in the way of determining the exact variation in friction under different conditions of brake-shoe pressure and speed. The apparatus that has been provided is well adapted to the purpose; but such an investigation requires much more time than the committee has been able to devote to it thus far.

One thing that should be ascertained, in order to make the results obtained most useful, is the friction between car wheels and steel rails, on which depends the maximum braking power that may be applied to cars.

In carrying on its work the committee has been impressed with the fact that great variations in the retarding power of

freight and passenger car brakes may result in service from the lack of uniformity in the friction furnished by the great variety of brake shoes used, notwithstanding the fact that the brake gear, in all other respects, may be adapted to giving the best results. Much time has been devoted to the development of air-brakes and brake gear that will operate successfully within reasonable limitations, and it would seem that, while certain standards have either been suggested or adopted by this Association covering brakes, it would be entirely proper to extend limitations to brake shoes as well. The committee is not prepared to recommend anything in this respect at this time, but would present this matter, as well as others pointed out, for the further consideration of this Association.

RESULTS OF TESTS.

Shoe E2.—April 25, 1895. Malleable Iron. Dayton Malleable Iron Co.

No. of test.	Travel of wheel. Feet.	Initial speed. Miles per hour.	Mean pull on brake-shoe. Pounds.	Co-efficient of friction.	Maximum co-efficient of friction at beginning of application. Per cent.	Maximum co-efficient of friction at 15 ft. from end of stop. Per cent.
1	Thrown out.					
2	1,226	40.00	475 5	17 1	22.4	32.1
3	1.224	39.55	487.4	17.4	21.4	32.1
4	1,204	39.95	500.2	17 9	21.1	30.8
5	1,250	40.00	474.3	16.9	20 7	31.8
6	Thrown out.		Card torn.			
7	1,168	40 00	522.8	18.7	22.1	33.1

Shoe A3.—April 26, 1895 Pennsylvania R. R.

1	817.67	39.43	732.8	26 2	29.8	37.4
2	798.67	39.77	752.2	26.9	33.1	36.1
3	To be thrown out. See note.					
4	761.67	40.00	810.5	29.0	32 4	35.1
5	767.67	40.00	798.0	28.5	30.4	39.8
6	755.33	40.46	810.3	29.0	31.4	39.4
7	765 67	40.46	785.8	28.9	3 .2	38 8

Shoe B1.—April 25, 1895 Hard Cast Iron. Ramapo Wheel and Foundry Co

1	1,024	40.91	578 4	26.7	27.7	31 8
2	1,087.3	39.55	505 6	18.1	23.4	34 1
3	1,165.3	40.67	479 7	17.2	22.7	30.4
4	1,138.3	40.91	514 8	18.4	22.1	34.1
5	To be thrown out.					
6	1,212.3	40.00	473.4	16.9	21.4	33.8

Shoe C3.—April 27, 1895. Soft Open Hearth Steel. Solid Steel Co.

1	1,335	40.00	420.9	15.00	16.7	25.4
2	1,321.3	40.00	432.3	15.5	16.7	26.7
3	1,355.67	40.46	405.7	14 5	16.7	27.4
4	1,286	40.00	445.5	15.9	20.4	25.4
5	1,233.3	40.46	448.6	16.00	21.7	27.4

Shoe D3.—April 27, 1895.—Chilled Wheel—Hard Open-Hearth Steel. Solid Steel Co.

1	1,399	39.55	415.7	14.9	19 1	26.4
2	1,398	39.55	407.7	14.6	18.1	26.1
3	1,394	39.09	402.6	14.4	17.4	26.1
4	1,425	40.46	403	14.4	17 7	26.4
5	1,472	40.00	418.8	15.0	17.4	26.4

Shoe F1.—May 2, 1895.—Chilled Wheel - Special S. T. Malleable Iron. Dayton Malleable Iron Co.

1	No Chronograph record.					
2	1.131.5	40.55	538.6	19.3	23.4	34.1
3	1 209.8	40.55	491	17.7	22.1	32 4
4	1,287.8	40.55	449 9	16.1	22 4	32.8
5	1,314.7	40.33	488.4	16.1	22.1	31.4
6	1,322	40.79	472.8	16.9	22.7	33.4

Shoe M1.—May 2 and 3, 1895.—Chilled Wheel—Wrought Iron (Pressed). Schoen Manufacturing Co.

1	1,137.5	40 55	519.2	18.5	20 1	25.7
2	1,203.0	41.00	498.2	17.8	18.4	28.4
3	1,080.8	39.65	514.2	18.4	20.1	27.7
4	1,144.8	40.55	498.5	17.8	19.4	27.7
5	1,190.4	40.55	500.5	17.9	21.1	30.8

Shoe G1.—May 3, 1895.—Chilled Wheel—Special C. W. Malleable Iron. Dayton Malleable Iron Co.

1	1,242.5	41.00	514 7	18.4	22.7	33.4
2	1,256.5	41.00	471.6	16.9	21.7	32.4
3	1,231.7	40.53	487.2	17.4	21.1	31.8
4	1,287.9	40.79	501.4	17.9	20.1	33.1
5	Thrown out. Chronograph record wrong.					

Shoe I1.—May 3, 1895.—Chilled Wheel—Soft Steel (Pressed). Schoen Manufacturing Co.

1	1,191	40.79	480.2	17.2	20.1	29.1
2	1,113	40.33	511.2	18.3	19.4	30.1
3	1,128.2	40.33	517.8	18.5	20.1	28.4
4	1,123	39.42	486	17.4	21.4	30.1
5	1,145	39.19	491.4	17.5	19.7	28.7

Shoe H 2.—May 6, 1895.—Chilled Wheel—The Congdon Shoe. The Sargent Co.

1	To be thrown out.					
2	1,073	40.10	532.1	19 00	26.1	28.1
3	To be thrown out.					
4	1,090	40.55	545.4	19.5	24.7	30.1
5	To be thrown out.					
6	1,241	41.01	492.0	17.6	22.4	29.4
7	1,159	40.10	480.6	17.2	26.1	26.4
8	1,179	40.10	506.1	18.1	21 4	26.7

Shoe I1.—May 9, 1895.—Chilled Wheel—The Meehan Shoe The Sargent Co.

1	1,254	40.10	434.2	15.5	21.4	23.4
2	1,291	40.55	417.0	14.9	20.1	22.7
3	1,3 9	40.33	401.2	14.3	20.4	24.4
4	1,468	40.33	382.6	13.7	19.1	24.1
5	1,410	40.55	382.6	13.7	21.4	21.4

Shoe N2.—May 9, 1895.—Chilled Wheel—Sargent Special Shoe. The Sargent Co.

1	Paper badly torn.					
2	1,013	40.10	561.1	20.1	20.7	30.4
3	1,056	40.55	532.9	19.0	21.1	26.1
4	1,471	40.79	375.4	13 4	16.0	22.1
5	1,180	39.87	490	17.5	17.4	25.1
6	1,223	41.01	487.7	17.4	20.1	24.1

Shoe J3.—May 9, 1895.—Chilled Wheel—The Lappin Shoe. The Lappin Brake Co.

1	1,219	40.33	452.8	16 2	18.1	29.8
2	1,391	40.55	406 3	14.5	16.7	28.1
3	1,333	40.10	422.1	15.1	16.7	28.7
4	1,374	40.55	413.6	14.8	14.7	28.4
5	1,341	40.55	429.1	15.3	16.4	29.8

Shoe K2.—May 10, 1895.—Chilled Wheel—The Safety Shoe. The Safety Brake Shoe Co.

1	913.6	39.87	6 5.5	21.6	20.1	30.8
2	840.6	40.33	738.4	26.4	31.4	34.1
3	788.6	40.10	779.1	27.8	34.8	33.1
4	806	39.87	766.2	27.4	30.4	33.4
5	757.2	40.10	813.9	29.1	31.8	36.1

Shoe A3.—May 10.—Chilled Wheel—Soft Cast Iron. Pennsylvania Railroad Co.

1	No time record: to be thrown out.					
2	1,191	63.66	1,291	12.0	13.9	17.9
3	1,044	63.34	1,524	14.2	14.7	19 0
4	1,073	64.71	1,508	14.0	14.8	20.5

Shoe B2.—May 14.—Chilled Wheel—Hard Cast Iron. Ramapo Wheel & Foundry Co.

1	No time record.					
2	1,361	64.25	1,297	12.1	13.6	15.1
3	No time record.					
4	No time record.					
5	No time record.					
6	1,571	64.71	999	9.3	10.9	13.3
7	1,660	64.25	969	9.0	9.6	15.2
8	To be thrown out.			Speed only 58 m p h.		
9	1 625	64.71	1,018	9.5	10.5	15.2
10	1,644	65.62	1,015	9.5	10.8	15.9

Shoe C3.—May 14.—Chilled Wheel—Soft Open-Hearth Steel. Solid Steel Co.

1	2,018	65.62	851.4	7.9	8.7	15:9
2	1,879	65.62	864.8	8.0	7.8	16.8
3	1,631	64.71	956.00	8.9	8.9	17.0
4	1 609	64.71	990.6	9.2	9.9	16.5
5	1,594	64.71	986:8	9.2	10:5	16.3
6	1,642	64.71	1,017	9.5	10.2	17.5
7	To be thrown out.					
8	1.561	63.66	984	9.2	8.9	16.5
9	1,591	64.25	964.4	9.0	9.0	16.8
10	1.650	64.25	913.6	8.8	9.1	16.9
11	To be thrown out.					

Shoe D3.—May 15.—Chilled Wheel—Hard Open-Hearth Steel. Solid Steel Co.

1	1,860	64.25	796.2	7.4	7.9	13:9
2	1,867	64.71	826.8	7.7	8.4	14.8
3	Thrown out.		(Notes.)	Clock stopped.		
4	Thrown out.		(Notes.)	Clock stopped.		
5	1,669	64.71	914.9	8.5	9.1	15:3
6	1,755	65.17	909.6	8:5	9.5	14.8
7	1,559	65.17	931.8	8.7	9.1	14.1

Shoe E2.—May 15.—Chilled Wheel—Malleable Iron. Dayton Malleable Iron Co.

1	Thrown out.		(Notes.)			
2	1,819	64.71	849.6	7.9	8.0	14.3
3	1.811	64.71	915.6	8 5	8 3	13.3
4	1 817	63.34	879.8	8.2	8 5	13.4
5	1,808	64.71	876.8	8.2	8.8	13.5

Shoe F1.—May 15.—Chilled Wheel—Special S. T. Malleable Iron: Dayton Malleable Iron Co.

1	1,823	64.71	885	8.2	8.4	9.8
2	2 066	65.17	785	7.3	8.3	14.3
3	2,206	65.17	725.2	6.8	7.9	13.9
4	2,125	65.17	744.6	6.9	7 9	14.9
5	1,903	64.71	811	7.6	8.0	14.3

Shoe G1.—May 15.—Chilled Wheel—Special C. W. Malleable Iron. Dayton Malleable Iron Co.

1	1,750	63.66	849.6	7.9	7.4	13.2
2	1 851	64.25	800.1	8.0	8.8	13.3
3	2,102	64.25	651.1	6.1	6.9	14.1
4	2.197	64.71	715.4	6.7	7.1	14.5
5	1,915	64.25	774.4	7.2	7.8	14.6

Shoe H2.—May 15.—Chilled Wheel—Congdon Shoe. Sargent Co.

1	1,582	64.25	922.6	8.6	8.1	16.2
2	1,474	63.66	1,015	9 5	9 1	16.2
3	1,438	63.66	980.2	9.1	8.6	16.2
4	1,416	63.34	1,057	9.8	9.6	17.1
5	1 346	63.66	1,038	9.7	10.1	15.9
6	Thrown out.		(Notes.)	Fulcrum plates broke.		

Shoe I2.—May 15 and 16.—Chilled Wheel—Meehan Shoe. Sargent Co.

1	1,633	64.71	871	8.1	9.9	15.0
2	1,689	64.71	891.3	8.3	9.2	14 9
3	1 709	64.25	813.2	7 6	8.5	14.6
4	1,754	65 17	839.8	7.8	7.7	14.1
5	1,6 6	64.25	908 6	8.5	9.1	14.3

Shoe J3.—May 16.—Chilled Wheel—Lappin Shoe. Lappin Brake Shoe Co.

1	1 671	63.66	918.4	8.6	8.6	13.7
2	Thrown out.		(Notes.)	No time record.		
3	2.059	64.71	697	6.5	7.1	11.9
4	1,891	61.98	793.9	7.4	6 7	13 6
5	1,848	65.62	805	7.5	7.4	13.6
6	1,770	65.62	888.8	8.3	8 4	12.8

Shoe K2.—May 16.—Chilled Wheel—Safety Shoe. Safety Brake Shoe Co.

1	1,069	64.25	1,421	13.2	10.3	19.7
2	929	64.71	1,623	15.1	14.9	22.1
3	Thrown out.		(Notes.)	Main lever rested on shaft.		
4	922	64.25	1,690	15.7	15.9	23.7
5	914	64.25	1,718	16.0	16.0	23.7
6	944	64.71	1,638	15.3	16.1	22.8

Shoe L.—May 16.—Chilled Wheel—Soft Steel (Pressed). Schoen Manufacturing Co.

1	1,584	63.66	890.4	8.3	7.0	15.9
2	1,580	65.17	880.2	8.2	7.2	16.9
3	1,542	63.66	913	8.5	8.9	16.0
4	1,444	64.71	933.2	8.7	7.9	18.3
5	1,422	64.71	981.2	9.1	9.0	16.5

Shoe M1.—May 16.—Chilled Wheel—Wrought Iron (Pressed). Schoen Manufacturing Co.

1	Thrown out.		(Notes.)			
2	1.391	64.71	1,1 0	10.4	9.5	20.5
3	1,784	64.71	1,193	11.1	10.7	18 5
4	1,408	64 71	1,113	10.4	11.2	17.3
5	1,446	64 25	1,071	10.0	10.4	18.3
6	1,339	65 17	1,155	10 8	10.2	18.6

Shoe N1.—May 16.—Chilled Wheel—Sargent Special Shoe. Sargent Co.

1	Thrown out.		(Notes.)			
2	1.414	64 25	1,089	10.1	11·8	14.4
3	1,399	64 71	1,162	10.8	12.6	17.4
4	1.635	64.2	1,005	9.4	11.5	14.8
5	1,419	64.71	1,109	10.2	11.2	16.8
6	Thrown out.		Record incomplete.			

Shoe A3.—May 16 and 17.—Steel Wheel—Soft Cast Iron. Pennsylvania Railroad.

1	Thrown out.		(Notes) Wheel was rusty, resulted not to be depended upon.			
2	Thrown out.		Record incomplete.			
3	Thrown out.		(Notes.)			
4	1,713	64.71	936.8	9.2	11.4	16.7
5	1,860	64.71	857.4	8.0	9 5	16.6
6	1.710	65.17	951.2	8.9	11.9	16.8
7	1.627	64.71	1,006	9 4	11.8	17.2
8	Thrown out.		(Notes.)			

Shoe B2.—May 17.—Steel Wheel—Hard Cast Iron. Ramapo Foundry Co.

1	Thrown out.		(Notes.)	Fulcrum plates broke.		
2	2.020	64.71	790.5	7.4	8.1	14.1
3	Thrown out.		Record incomplete			
4	1,977	65.17	828 1	7.7	9 1	13.8
5	2,040	64.71	804 2	7.5	8 0	15 2
6	1,970	65.17	831 4	7.8	9 1	15.0

Shoe F1. May 17.—Steel Wheel—Special S. T. Malleable Iron. Dayton Malleable Iron Co.

1	1,952	64.71	820.3	7.6	9.4	14.2
2	1.948	64 71	827.8	7 7	9.1	14.4
3	1,946	65 17	775.2	7.2	7.6	14.1
4	1,999	64 71	768.4	7.2	7.3	13.1
5	2,078	63 66	760.8	7.1	6.9	13.8
6	2,177	65.17	729.7	6 8	6 4	13.2

Shoe G1.—May 17.—Steel Wheel—Special C. W. Malleable Iron. Dayton Malleable Iron Co.

1	1,964	64.71	795.2	7.4	7.9	13.7
2	2,108	64.71	740.4	6.9	7.7	13.7
3	2,076	65.17	738.1	6.9	7.2	13.3
4	2,122	64.71	732.4	6.8	8.4	12.9
5	2,114	64.71	718.6	6.7	8.1	13.8

Shoe J3.—May 17.—Steel Wheel—Lappin Shoe. Lappin Brake Shoe Co.

1	1,960	63.34	748.2	7.0	6.6	13.9
2	1,843	64.71	743.8	6.9	7.3	14.3
3	1,933	65.17	812.1	7.6	8.3	13.9
4	1,789	64.25	787.9	7.3	8.0	14.5
5	Thrown out.		(Notes.)	No time record.		
6	1,632	64.25	816 7	7.6	8.5	14.5

Shoe E2.—May 18.—Steel Wheel—Malleable Iron. Dayton Malleable Iron Co.

1	Thrown out.		(Notes.) Card indistinct.			
2	1.879	65.17	777.0	7.2	8.3	13.9
3	1,774	65.17	8 4.6	8 0	8.8	13.9
4	1,890	64.71	840.4	7 8	8 2	13.9

Shoe K1.—May 18.—Steel Wheel—Safety Shoe. Safety Brake Shoe Co.

1	1,371	64.71	1,139.5	10.6	12.4	16.2
2	Thrown out		(Notes) Shoe broke.			

Shoe K3.—May 18.—Steel Wheel—Safety Shoe. Safety Brake Shoe Co.

1	1,304	64.71	1,170.0	10.9	11 3	16.7
2	1,659	64.71	912.3	8.5	9 4	14.6

Shoe I1.—May 21.—Steel Wheel—Meehan Shoe. Sargent Co.

1	Thrown out.		(Notes.)			
.	Thrown out.		(Notes.)			
3	Thrown out.		(Notes.)			
4	1,998	65 17	758.9	7.1	7.8	15.0
5	1,860	65.17	845.3	7.9	8.3	14.8
6	1.943	64.71	819.4	7.6	8.3	14.6
7	Thrown out		(Notes.)			
8	Thrown out		(Notes.) Card indistinct.			
9	1,901	64.71	796.2	7.4	8.2	14.5

Shoe H2.—May 22.—Steel Wheel—Congdon Shoe. Sargent Co.

1	1,659	64.71	952 6	8.9	9.7	14.1
2	1.683	64.71	894.8	8.3	9.0	13.8
3	1,851	64 71	818.1	7.6	8.2	14.0
4	1.903	64.25	819.4	7.6	8.4	13.9
5	1,780	64.71	782.8	7.3	8.0	13.9

Shoe C2.—May 22.—Steel Wheel—Soft Open Hearth Steel. Solid Steel Co.

1	1.583	65.62	981.6	9.1	8.4	19.2
2	1.515	65.62	1,005.5	9.4	8.9	19.6
3	Thrown out.		(Notes.) Paper torn			
4	1,369	64.25	1 096	10.2	9.0	19.3
5	1,373	64.71	1,122.3	10.5	9 4	19.1
6	1.450	65.17	1,060.1	9.9	10.2	21.3
7	1.432	64.71	1,044.7	9.7	9.6	20.3
8	1,845	64.71	1,120.5	10.5	9.8	19.3

Shoe D3.—May 22.—Steel Wheel—Hard Open Hearth Steel. Solid Steel Co.

1	1,476	65.62	1,039.5	10.7	9.3	18.9
2	1,395	65 17	1 130.2	10.5	10.0	20.5
3	1,448	65.62	1,081.2	10.1	8.9	20.6
4	1,488	64.71	1,021.0	9.5	8.7	18.0
5	Thrown out.		(Notes.)	No time record.		
6	"	"	"	Main fulcrum plate slipped.		
7	"	"	"	" " " "		
8	1,532	65.17	1,045.7	9.7	8.8	18.3

MR. BARR: I make a motion to reconsider the motion discharging the committee on road test. These committees should be continued another year; they should work together and hand in a final report. The motion was reconsidered.

MR. BARR: I move that the Committee on Road Test be continued to act in conjunction with the Committee on Laboratory Test, and to make either a separate or joint report, as they see fit. (Carried.)

MR. WAITT: The Committee on Road Test have stated that it was not deemed advisable, owing to some practical difficulties, to make a determination as to the effect of the brake shoes on the tire of the wheels. Many of the indicators or gages for determining or indicating the wear on tires and wheels are difficult to use or expensive. In the work that was done by the Lake Shore & Michigan Southern road it was determined that we would try to get as accurate an indication as possible as to what the effect was of the brake shoes on the chilled wheels and also on the steel tires. We found quite a simple and accurate method of doing this, which I would like to present to the convention, together with the data that we obtained, as such data surely has an important bearing on the question of the use of different kinds of brake shoes. Instead of using anything in the way of a gage which might show by means of a pencil the contour of the wheel tread, we adopted a form of flask of which I have some blue prints and sample. The general outline is that of the tread of the wheel.

This flask is placed over the wheel at a point which we indicate with a prick punch mark and is filled with quick setting plaster of paris, the wheel being greased so that the plaster will not stick to it. Then these casts, which are in the form shown, are labeled, indicating the number of the car, and the number of the wheel and kind of shoe, etc. After the special shoes were worn out we took a second cast, and when any changes were made we also took some casts of the wheels that were removed and also the wheels that were applied at a similar point, making diagrams from these plaster-of-paris casts, both before and after, we got a result which shows the original shape of the tread of the wheel; and the shape of the wheel after the service; and from this we are able to judge of the comparative wearing effect of the different metals on the wheels; these were not found to be entirely in accordance with the friction. It has been said that the shoes which will last the longest will wear the wheel most. That was not found to be the case; the friction and the wearing properties of the shoes not being in any regular ratio.

It is found that the wear of the following special shoes is about equal to the wear in the same time of soft cast iron shoes. Cast steel shoe B, on steel wheels; Meehan shoe I, on cast wheels; malleable shoe G, on steel wheels; malleable shoe G, on cast wheels; safety shoe K, on steel wheels; safety shoe K, on cast wheels; Congdon shoe H, on cast wheels; Sargent shoe N, on cast wheels; malleable shoe F, on cast wheels; malleable shoe F, on steel wheels; Lappin shoe I, on cast wheels; Sargent shoe N, on steel wheels; malleable shoe E, on steel wheels.

With wrought iron shoe M, on cast wheels, the tread of wheels was badly grooved. The same shoe on steel wheels, wears on tread three times as much as on the cast iron. The Schoen pressed steel shoe L wore the cast iron wheels slightly less than the common cast iron shoe, but on steel wheels wore the tire about 50 per cent. more. Soft open hearth steel shoe C, on steel wheels, wore four times as much as with special shoes. Lappin shoe on steel wheel 50 per cent. more wear with special shoe. Open hearth steel shoe D, the same. Wrought iron shoe M, on steel wheel, wore three times as much. Meehan shoe I., on steel, wore double as much as the soft iron, the same with Congdon shoe on steel.

MR. BARR: We spend $10 for wheels, where we spend $1 for brake shoes. The information which Mr. Waitt gives us seems to me to be extremely valuable in connection with the brakeshoe test; and I move that the information be printed in the proceedings. (Carried.)

MR. MORRIS: For my own information I had some figures taken of the test shoes; and perhaps it may be well to submit this for the information of the Association, as they are so close to the diagrams, I think it would be well for the members to see them. The figures were handed to the Secretary.

MR. RHODES asked whether in the matter of metal for cast iron wheels the committee found that the brakeshoes which are generally used—that is to say, the cast-iron shoes made of hard material, are the best to be used against cast-iron wheels in freight service; or has some other metal been demonstrated to be better?

MR. BUSH: The Safety brake shoe, which is composed largely of cast iron, gives the greatest friction, and that gives the greatest retarding power. You can stop a train quicker with the soft cast iron shoe in freight service than you can with any other. The question of wear does not come in. The result of the road test committee indicates pretty clearly to what extent that question plays a part; and no doubt the joint committee will be able to tell definitely on this point, at the next convention, which of the shoes are the most practicable in all respects for freight service.

MR. BARNES: On that point, in making a summary of these tests, I find the three shoes most commonly used in freight service on chilled wheels are about as follows: That the average braking power for soft cast-iron is 26 per cent.; hard cast-iron, 18 per cent.; Congsden shoe, 18 per cent., making the Congsden and hard cast-iron the same. In the report on service test you will see that the wear of the hard and soft cast-iron is practically the same, while the Congsden shoe is only 30 per cent. of that, showing that the Congsden shoe, so far as wear and friction is concerned, is superior to the hard cast-iron shoe; but outside of the fact of the friction of the shoes we ought to understand what it is we consider in an emergency brake stop. We have the Westinghouse Air Brake Company tests, as they are on record, and these are made with soft cast-iron shoes to show the possibilities of braking for safety. Now, a train running at 40 miles an hour can make an emergency stop within 600 ft., with soft cast-iron brake shoes, that is, with an unloaded car; 70 per cent. braking force, not a full car, as is often understood. When the car is loaded, instead of the braking force being 70 per cent., it is 23 per cent., which would increase the distance to 1,800 ft. by ratio. If, in place of the soft cast-iron shoe, you put on a hard cast-iron shoe, with 16 per cent. friction, instead of 28 per cent. friction, that would be doubled, or 3,600 ft. An emergency stop with a loaded train requires 3,000 ft. For safety you are forced to the cast-iron shoe, while practical operation may demand the use of the hard cast-iron shoe, because the foundries have the hard scrap and not the soft scrap, and to say soft scrap would be more expensive. I think it is well that this point should be understood, because it must affect the report of the committee next year as to the most acceptable brake shoe.

MR. BARR: The railroads to-day are suffering an immense loss from sliding wheels, which would indicate that we do not need to probe very deeply to find something to increase the co-efficient of friction. These points should be considered.

MR. SANDERSON: Did Mr. Barnes figure on the use of sand?

MR. BARNES: My figures had no reference to sand. I said 3,000 ft. to be conservative, and left the 600 ft. for sand. The Air Brake Men's Association brought up another point, which was if a railroad wanted to use a harder brakeshoe to save money they might use a plain flange shoe, which would increase the friction 30 per cent. without changing anything under the car.

MR. SOULE: As to Mr. Rhodes' question, the tables on pages 7 and 8 of the report mean simply this—that the co-efficient of friction of the shoes mentioned there was absolutely the same; then the most economical shoe to use in freight service would be the one which performed the given service at the least cost, on the assumption that the friction is the same; that would indicate that shoes L and M, soft-pressed steel would be the most economical shoe, because the cost of the service performed by them would only be three-tenths of the braking service of hard cast-iron shoes; and conversely it would indicate that the most expensive shoe, if the friction was the same, would be 43 per cent. greater. I think the committee will be constrained to recommend a safe middle cost—somewhere between economy on one side and greater safety on the other side.

MR. HERR: I am not clear whether the shoes were applied to one side or both sides of the wheel referred to in the report; if on one side, whether the effect of the thrust on the bearing in retarding the motion of the wheel was taken into consideration; I would like to ask the committee if they consider that these tests were made under normal conditions as to the excessive heat developed. The laboratory tests are made at speeds 40 and 60 miles per hour; it would seem that many of the speeds under which the trucks would be used would be less than that.

MR. BUSH: One brake shoe was applied to one side of the wheel. So far as the coefficient of friction is concerned it would not affect the diagram. It is difficult to eliminate every possibility of error, but the committee feels it is a minimum and not sufficient to affect the result. As to the heating of the shoes, the actual condition of service could not be obtained; in actual service you sometimes have a wet wheel and wet rail, and we did not obtain that, and, again, the air around the wheel is constantly changing and tending to cool the parts. As to the speeds, it was the desire of the committee to make a long series of tests under varying conditions, but this was found impracticable, as the results would take so much time. We adopted the conditions as to speed stated in the report. They would represent the severest conditions to be met with in actual service. With intermediate speeds possibly the results might be slightly different. The committee considers that the speeds do not affect friction as much as variation in pressure.

FRIDAY'S SESSION.

President Lentz called the meeting to order at 9:10 a. m.

The amendment of Mr. Sanderson to Rule 3, paragraph (r 1) was carried as follows:

Wheels out of gage, or wheels that measure less than 4 ft. 5¼ in., or more than 4 ft. 5⅛ in. between flanges, or less than 4 ft. 4 in. over treads. See Fig. 6 a. This does not apply to wheels cast prior to Sept. 1, 1894. A new Fig. 6 shall be made similar to Fig. 6, to correspond with the dimensions given in paragraph (r 1). The measurements in both cases on Fig. 6 and Fig. 6 a to be made at the same height on the wheel as the center of the axle.

MR. WAITT: I move that the rules be approved as they stand as a whole for the coming year. It seems unfortunate that, recognizing the faultiness of some of the rules, we are unable to present anything that will remedy the difficulty at the present time. (Carried.)

The report of the Committee on Lubrication of Cars was then read by Mr. Waitt.

LUBRICATION OF CARS.

The report proper of this committee is very brief. The committee reprints the description of apparatus used and tests made at the Stevens Institute presented by Professor Denton before the 1890 meeting of the American Society of Mechanical Engineers and printed in the *Transactions*. The committee also reprints Professor Denton's address of 1890 before the American Association for the Advancement of Science on the history of attempts to determine the relative value of lubricants by mechanical tests. The committee finds on inquiry of officers of the lubricating department of the Standard Oil Co., that the results obtained by the apparatus described vary so much from those got in actual service that they cannot be relied upon as correct indications of comparative values of lubricants. The committee also states the case of a railroad company that got up an oil-testing machine, decided from its results to use paraffine oil, and very disastrous consequences followed and the machine is scrapped. From this the committee concludes that the conditions of actual service cannot be reproduced in shop tests. The requirements are laid down that a successful oil must flow freely at a temperature below zero as well as above 100, must not become volatile in summer, must be free from gummy elements and must give good results in unfavorable conditions. The committee concludes that these conditions cannot be obtained in actual service with low-grade oils, and believes that it is the general sentiment on the larger roads that the higher grade oils are the cheapest in the end. The committee recognizes the importance of a series of service tests by various roads extending over considerable time, but recommends that the subject be laid over until business conditions improve.

MR. BLACKALL moved that the report be received and the committee discharged.

MR. BARNES: As to the sentence "The general sentiment on the larger roads in the country is that the high grade oils are the cheapest in the end, all points being considered," how are we to determine what makes high grade oil; and, if shop tests cannot be made to show what is high grade oil, how can you determine it? In this report we are mistaking the errors of inspectors in drawing conclusions for the errors of the machine.

MR. WAITT: It has been shown by the experiments of a large oil company—possibly the largest in the world—that the results of shop tests did not correspond with the results of actual service, as the conditions could not be fully reproduced, and, therefore, they did not deem it wise to continue experiments in that line. On some other points I have taken the ground that service tests were better to base final judgment on than shop tests, namely, in connection with the coupler question. I think the same is true with the oil question and journal-bearing question; shop tests must be taken with a great deal of latitude because the actual conditions of service are not duplicated. Unless you are sure that the conditions are duplicated, you do not want to base a final conclusion on the shop test.

MR. BARNES: Can a high grade oil be determined by a shop test?

MR. WAITT: I think probably that can be done. It is a question whether all high grade oils are applicable to car lubrication, summer and winter, and will prove equally satisfactory; some will be. What the requirements are that will adapt high grade oil to use at all times of the year are doubtful. I think the term "high grade oils" would refer to those which are thoroughly refined and free from impurities.

MR. BARR: I suppose a high grade oil is one you pay 30 cents a gallon for, when you could get some for 5 cents. There is no doubt about the difference in tests—whether they are laboratory or road tests. We use in general on our road an oil for which we can run passenger cars at about 13 cents a thousand miles. I have taken that oil and put it on a special car, on a special train, on a special test, and ran the car at a cost of 5 cents a thousand miles. If you took that and made a test in the laboratory you might get still better results. If you can take a special car and run it for 5 cents a thousand miles, why cannot you do it with all the cars? If you could take the laboratory test, and put the proper amount of dust in on the laboratory test, proper amount of ignorance of the man pouring the oil in, and proper amount of laziness of the car inspectors—some of them are pretty good too—I doubt not in the laboratory you would get tests equivalent to the road. I doubt not, on the other side, if you took our mechanical engineers and our scientific institution graduates, and put them out on the road to look after the bearings, instead of the inspectors, we would be in a hole. We said to the men on the St. Paul road, "If you do not bring the consumption of oil down we will discharge you." After two years, and the discharge of a few men that could not use less oil, we cut our consumption in two. We can use high grade or low grade oils, but we will not get the results unless we follow them up in the proper executive manner.

MR. RHODES: It is interesting to know that a large oil company, wishing to know what was the best lubricant to use under equipment, has instituted the investigation referred to. What is the result of the investigation made under the most scientific method that offered? From the address of Vice-President Denton in the report we see that he drops the laboratory tests and endeavors to get the actual results in service. The Standard Oil Company was not able to draw any results from the figures, but decided to go to practice and endeavor to produce their data and stock in trade from the practice of the different railroads. Is it not strange that the practice should be so different as to the oil we use under

our cars? If one road should use material in its drawbars which cost 6 cents a pound and another that costing 2 cents a pound, and these should be interchanged, what an objection would be made at once! If we are using an oil which cost 18 or 20 cents a gallon on cars as they pass over our line and our neighbors down East use an oil costing 6 cents a gallon we say nothing. It is curious that this difference should exist.

The figures on the board show the cost per 1,000 miles, loaded, of lubricants for freight cars on the C., B. & Q road from 1885 to 1894:

Low Grade.		High Grade.	
1885	13 05	1890	12.78
1886	14.04	1891	14.01
1887	10.11	1892	14.74
1888	12.57	1893	14 61
1889	11.32	1894	7.68

From the actual figures that were charged you will see that the cost per thousand miles really increased until we got to 1894. The figures on the left relate to low grade oil; those on the right to high grade oil. In freight cars there is no check to the expense; those who use the oil are not confined to any particular department. In 1893 and 1894 we had to look after our expenses in a way that we never did before. Toward the end of 1893 everyone was interested in the question of oil. It became next to impossible for any man to waste oil. The figures of 1894 were brought down to 7.68; we are doing as well this year, if not a little better. I feel confident that had we used the same efforts in 1889 as 1894 we would have had practically the same result; it might have been two or three cents in place of seven cents.

MR. BARR: There is one point in the statement which spoils my admiration of it. Mr. Rhodes and our company exchange at Port Byron: when he started his economical administration of oil at that point we commenced to use more oil. It usually was about $25 a month; but it went right up. I was going to discharge the oiler, but he said that the Q. road sent their cars there without much oil, and as they were going out on our fast trains he had to oil them. I looked for a place to reciprocate, but could not find one.

MR. MITCHELL: I substantially agree with Mr. Rhodes. We have been using the high grade oil for six or seven years; I think the same as he uses. We keep an accurat account of all oil used, and make a statement each month of the oil used against the mileage. Last year our cost was, per 1,000 miles, 8 cents; that has been the average for four or five years. We keep a record of hot boxes, and since we have introduced this system we have fewer hot boxes.

MR. HIGGINGS: In regard to the large reduction made in 1894, how did the C., B. & Q. road stand in regard to the cost of journal bearings; was there any increase in that?

MR. RHODES: In looking after our expenses as closely as we have been doing, I do not believe it would be possible to have any extra expenses in that matter without our attention having been called to it; I have heard of none. Mr. Barr is a friend of mine; we get along very well, but sometimes one's friends impose on you. At Port Byron Junction we were doing all the oiling.

MR. ADAMS: It does not take a great deal of technical knowledge to know there is a great difference on different roads as to the amount of oil necessary to use and brass worn. In talking with our lamented friend Lauder on this subject, he said the greatest amount of service he could get from brasses on the Cape Cod road, which ran through a district where the sand was very gritty, was 1,200 miles to the ounce of brass worn, and he was satisfied with it. We found that we were getting, while using the same oil, about 4,500 miles to the ounce of brass worn; so you see the difference in the condition of the two roads was very material, and that goes to show that the laboratory test does not amount to much without the practical test.

MR. HENNESSY: I think it is the fact that all roads have been giving more attention to repacking, taking old waste out of boxes and packing it very thoroughly. This additional labor ought to be counted in; consequently there is not so much reduction made as would seem to be the case.

MR. RHODES: The men who look after the oiling, in place of sitting down, have given more attention to the packing. We have not taken on any extra men.

MR. HAYWARD: A factor which enters into the economy of oiling is the condition of our equipment, particularly the trucks, and nearly all roads in the last two years have been paying great attention to that matter. We have given more attention to truck repairs and there have been larger-sized axles and journal bearings introduced. In all cases where we find a large increase in our oil consumption and number of hot boxes, we immediately look into the condition of the brasses and the condition of the trucks, particularly in passenger service. In the latter case we find it is largely due to trucks being out of square, and we spend money on the trucks and save the oil.

MR. SANDERSON: In following up the question of lubrication, we found that where we thought the oils were at fault, sometimes the brasses were at fault. A little irregularity at the back of the brass, which may be bearing improperly on the journal or bearing too hard against the collar, would run the expense of hot boxes up very materially; also the matter of dust guards—seeing that covers were put in the dust guard grooves made quite a difference; also the question of fitting the journal backs has a bearing on the oil consumption and number of hot boxes. Road tests, however carefully carried out, will bear with them all the uncertainties incident to a want of positive knowledge as to how well the brasses fit in the wedges; how true they are, how well the dust guards are kept up; how much oil is punched out of the backs by the loosening up of the waste. These points all have a bearing, besides the quality of the oil.

MR. GRIEVES: Some five or six years ago, the Baltimore & Ohio was using cheap oil, five or six cents a gallon. We went into the use of the high grade oil, 25 cents for freight and 35 cents for passenger. We found the first year we saved between fifty and sixty thousand dollars, accomplished by a careful watching of our oil boxes and getting a first-class brass, and also gaging and having our brass bearings and wedges of proper dimensions. We watched our dust guards very carefully; and also had an inspector to see that the oil was not wasted. At this time we are still using high grade oil, making 9.05 cents on freight and 30 cents on passenger cars per thousand miles. We have a heavy grade road. We think we are doing very well in the use of high grade oil.

MR. HERR: Are any members obtaining results in going from a high grade to a low grade oil?

MR. BRENNER: The gentlemen seem to attribute the favorable results obtained to the use of a high grade oil, and that the grade of the oil is regulated by the price. Judging by price, we are using a low grade oil; but we find we can run our freight trains at a cost of six cents a thousand miles, but we possibly may use more oil than those using the so-called high grade oil. I think one of the reasons that they have reduced the cost is because the oil costs so much that they are forced to watch and economize more closely. If the same care was employed with the low grade oils they might get better results than they do. The principal economy comes in from the care of the details.

MR. CROMWELL: It is important to know what kind of bearings are used with the cheaper grade of oil. The B. & O. has made some very favorable showings in reduction of amount of oil consumed with the high priced oil, but with that we introduced the lead lined bearings on our road. I think that is one of the most important features in connection with the economy in our oil. At the time we used cheaper oil we did not pay attention to the dust guards as we have since.

MR. SOULE: In 1894 both our engine and car mileage was greater than in 1893—owing to the extension of the road to West Virginia. The money paid for oils in 1894 was $19,000, less than 1893. That was due to a combination of circumstances. In 1893 we used a high price oil; I am not sure that it was a high grade oil. We then made an experiment on one division in the lubrication of locomotives, to see if the ordinary black oil could not be used as well as the special engine oil. The experiment was successful and it was extended over the entire line. We were buying our oil almost entirely in barrels, but we now buy it in tank cars. We are reaping a great benefit from that. There was a great waste of oil from evaporation and leakage when the barrels were lying around. We ship oil now in drums. A great many oil cans will spring their joints and the oil is leaking; we have introduced pressed steel oil cans with brazed joints. There are no end of ways that you can discover in which money is being spent for oil and no benefit coming from it. We are unable to give a statement of cost per thousand miles.

The report of the Committee on Air Brake Tests was read by the chairman, Mr. Rhodes.

AIR-BRAKE TESTS.

The committee submits a code or standard of efficiency for air-brakes. The first subdivision is condition of tests. These conditions include a rack for a 50-car train with all cocks, angles and connections as nearly as possible identical with those in train service. A drawing has been arranged, giving the proper fittings, piping, dimensions, etc. A uniform train-pipe pressure of 70 lbs. will be required, and electrical recording apparatus must be used giving an indicator card in the fiftieth car. Tests must be repeated three times, and the essentials for the quick-action brake are: first, graduation; second release; third, quick action.

The next sub-division is rack tests. The first is an application service test, and the requirements are that the brake shall show with full application and 6 in. travel a cylinder pressure of 50 lbs., maximum 52, minimum, 48. Four, six and 12-in. piston travel will be tried.

The second test is emergency application. Brakes must be applied on the fiftieth car with at least 40 lbs. pressure, with 6-in. piston travel in three seconds on the first movement of the engineer's handle; 55 lbs. must be indicated in 3½ seconds; final pressure not less than 15 per cent. and no more than 20 per cent. above service pressure. Here again four, six and 12-in. piston travel will be used.

An application test will be made emergency, cutting out three cars at a time, going back car by car to include the seventh. Quick action must be got on the fiftieth car as in the second test. Two other applications must be made with three successive cars cut out in any portion back of the fifth car.

The fourth test is for graduation. A reduction of 8 lbs. in train pipe must apply lightly 50 brakes. A further reduction of 4 to 6 lbs. should be increased to the pressure on all brakes. A reduction to 30 lbs. should equalize between the auxiliaries and the brake cylinders. In this test 6-in. piston travel will be used. In this test also one or more triples shall be tested, using instead of a brake cylinder a reservoir having the capacity of a cylinder with 8-in. stroke. The first admission to this cylinder shall be made with a train pipe reduction of not more than 5 lbs. Each succeeding reduction must reduce the pressure in the auxiliary not to exceed 3 lbs. The pressure in the train pipe should not be more than 3 lbs. lower than the equalized pressure in the brake cylinder and reservoir.

Test No. 5 is to determine the sensitiveness of the service valve. Three valves will be taken at random and tested separately on a locomotive and one car. Having a train pipe pressure of 70 lbs., air will be discharged as rapidly as it may through an opening in the engineer's valve from $\frac{3}{64}$ to $\frac{3}{64}$-in. diameter. Service action must take place and continue without any appearance of quick action until the opening has been enlarged to $\frac{9}{64}$.

Test No. 6 is to determine the sensitiveness of the quick action valve. Tests will be as in No. 5, and the air discharged through disk openings, increasing in diameter $\frac{1}{64}$ in. Triples must not show a range of more than $\frac{3}{64}$ before full quick action is reached. Full quick action must not take place before $\frac{11}{64}$, but must take place when the opening is $\frac{14}{64}$.

Test No. 7 is to determine the holding power of the brake in service and quick action applications. Gages will be placed on the cylinder and auxiliary reservoir of the first, twenty-fifth and fiftieth cars; 70 lbs. train pipe pressure brakes applied by admitting 15 lbs. into the cylinder of the first car. Records of pressure in reservoir and cylinder will be taken at first application in 5 minutes, in 10 and in 15. The quick action test will be the same except that all the air will be exhausted from the train pipe. The modification of this test will be made with dummy cylinders as in the graduating test.

No. 8 is a release test; main air reservoir cut in, any pump or boiler pressure may be used that will maintain the uniform head of 90 lbs. Having 70 lbs. in the train pipe, all air will be exhausted by quick action application; 90 lbs. pressure will be maintained against the diaphragm perforated by a $\frac{3}{32}$ hole and a record taken of all brakes released inside of 30 minutes. Not more than 10 per cent. must fail to release in the prescribed time.

Test No. 9 is to determine the time of charging one auxiliary reservoir, a head of 90 lbs. to be maintained in the main air reservoir and train pipe; reservoir to be empty and bleed cock closed. The time of charging to 70 lbs. should be 55 seconds; not less than 45 or more than 60.

No. 10 is to determine whether quick action will follow a service application. With an application of 20 lbs. pressure in the first cylinder a full quick action reduction will be made. Pressure in the first cylinder will be increased or decreased by steps of 5 lbs. until the point at which quick action ceases or commences is determined. It should take place with not less than 20 lbs. in the first cylinder.

Test No. 11 covers such additional tests as in the judgment of the committee the construction of the triple submitted warrants.

The last subdivision is train tests. It is recommended that a 50-car train test in actual service be made before accepting the result of the rack tests as final. In test No. 2 it is recommended that the time of application be measured from the first car to the fiftieth, which will determine the time occupied by the engine brake as against the car brake. Special care should be taken with engine and tank brakes to see that they do their full share of the braking. All brake shoes must have a proper bearing and should be of the same material. Shock tests should be on a level track with all slack pulled out when brakes are applied.

The committee adds that the time has come to discharge the committee and for the association to take some definite action on the work performed. It is suggested that the code be adopted as recommended practice and that classification No. 1 be adopted as the standard of the association.

MR. SANDERSON: I move that the report be accepted, the committee discharged and the recommendations they make submitted to letter ballot.

MR. BRONNER: Does the committee propose three grades of efficiency in the air brakes?

MR. RHODES: The idea of this code is that parties engaged in the manufacture of air-brakes will know what is required by the railroads of this country. The detail of the code explains it. When triples are made in accordance with the code, there will be various degrees; some will perform a portion of the work and some will not. We provide for grading all triples. The question came up—What is the standard of the association? We might have recommended that Nos. 1, 2 or 3 be the standard, but we thought that would not be wise; that triples which might be graded 2 or 3 would eventually become better and reach classification No. 1; and the committee proposed for the standard those triples conforming to classification No. 1. I think triples 2 and 3 should go into recommended practice.

MR. BRONNER: Most of our recommended practice is something we fail for some reason to adopt as standard. If railroads want to use grades 2 or 3 of triples they could use them anyway, whether recommended to practice or not. Anything we adopt in connection with the air-brake should be the best—No. 1 in efficiency. The probability is that makers classified as 2 and 3 will aim to attain to No. 1 in the future. We should not recognize Nos. 2 and 3 at all, and should not try to perpetuate the grades by recommending them.

MR. BARR: This is not the adoption of a standard, like the adoption of an axle. The details show methods of testing and classification that is good practice. We are

classifying, not using; and it provided in classifying the triples that nothing but No. 1 would be considered as standard.

MR. RHODES: I think that perhaps instead of adopting No. 1 as standard it should be adopted as recommended practice.

MR. BARNES: Last year at Altoona we tested a great many brakes, and a number—four of them—passed the standard requirements, as suggested in the report; No. 1 requirement. That shows that this report in recommending standard requirements is not recommending any one particular triple. If this was adopted as standard, it does not compel any railroad to buy any particular triple, as there was not one tested that could not be made to fulfill the standard requirement. If it failed, it was because of workmanship and design; the fundamental idea was correct; enough were tested to show that triples could be built up to your requirements.

In 1887 a great deal of work was done to determine what was a proper brake, and that proper brake is a better brake even than is required under this No. 1 code. To recognize any inferior brake at all is simply to recognize a brake that is badly made. The standard requirements, as stated here, are not higher than can be met on the designs proposed. The standard of this Association, after seven years' work, ought to be put in the form of a standard requirement for brakes, because the brakes are being purchased now—not for immediate use, because we have not the fast trains—but any good triple valve will outwear two or three freight cars. It is put through a series of tests that would wear it out if it could be worn out. The standard of this Association ought to be based on the expensive experiments made in 1887. If we are not going to use the brake there shown, we had better go back to the plain triple valve.

MR. GRIEVES: Are not the triple valves patented, and if so can they be adopted as recommended practice or a standard of this Association?

MR. SANDERSON: No particular triple; but only a standard of efficiency is recommended.

MR. SOULE: I would move as an amendment to the motion now pending that the last clause, "second," be stricken out.

Mr. Sanderson's motion, as amended by Mr. Soule, was carried.

MR. WAITT: It is hardly feasible for each road to conduct a series of tests similar to those at Altoona. The members should have the benefit of the apparatus devised, and the experience of the members who have worked on this air-brake committee. A standing committee on air-brakes should be appointed, subject to yearly changes, not to make a report each year, but to whom any new triples can be referred; and I make a motion to this effect. (Carried.)

The report of the Committee on Air Brake and Hand Brake Apparatus on Cars was read by the Chairman, Mr. Bronner.

AIR-BRAKE AND HAND-BRAKE APPARATUS ON CARS.

Circulars of inquiry have shown that the location of the hand-brake wheel on passenger equipment is not considered of great importance. No recommendation as to a standard location is submitted and a practically unanimous recommendation for no increase in the power of hand-brakes is received. The question of charges against car owners for air-brake work is covered by a scale of prices which is recommended for incorporation into the M. C. B. code of rules. An investigation of "Standards for Air-brakes on Freight Cars" showed them to be not especially well adapted to light weight cars. The use of 6-in. brake cylinders or auxiliary levers on such cars was recommended to the committee, but met with general disapproval by the members.

Replies representing 290,612 cars showed but one road, representing 17,312 cars using truck levers 6 : 24 in. as shown in the standards. The truck levers for air-brake freight cars represented by the replies received varied from 5 : 25 in. for the tire, and 5 : 25 in. for the dead levers, to 10 : 21⅛ in. and 9¾ : 17⅛ in., or 12 : 14 in. and 12 : 14 in. The same interesting variety prevails in cylinder and floating levers.

Mr. Rhodes moved that the report of the committee be received and the committee discharged. (Carried.)

MR. HIGGINS: It is unfortunate to pass over the location of the hand brake wheel on our passenger cars. There is always more or less trouble and also danger with the old location when an ordinary passenger car is coupled to a sleeping car with the vestibule.

MR. BRONNER: The committee found from the replies that very few members seemed to think it was of much importance, and as the interchange of passenger cars, outside of sleeping cars, is comparatively small, waived recommending the standard.

MR. WAITT: In connection with the report comes the matter of a standard for equipping cars with air-brakes, sheet 9, about two-thirds of that is not used as a standard, or considered practicable to be used as such, on account of it being the detailed drawings of one of the roads. I move that a committee be appointed for the purpose of looking over and revising the sheet and bringing in their report to the next meeting.

MR. BRONNER: The committee last year, in examining very carefully the sheet of standards referred to, found that its essential parts were being observed very largely, although in the detail it was not observed, and that there were 250,000 cars for which it would not be possible to recommend any standard as to details, as against 98,000 for which it would be.

MR. BARR: I amend Mr. Waitt's motion, to the effect that a committee be appointed to go over all the standards; not with the idea of changing them, but to give information each year as to how extensively they have gone into use; whether there are any objectionable points which require serious consideration, and anything else bearing on the subject. (The amended motion was adopted.)

The report of the Committee on Automatic Couplers was called for.

The Secretary read a letter from the chairman of the committee, Mr. J. M. Wallis, in which he stated his inability to arrange a meeting of the committee to prepare the report, and on motion the committee was continued another year.

The report of the Committee on Passenger Car Ends and Platforms was read by Mr. E. W. Grieves, the chairman. The chairman also read a letter from Mr. F. D. Adams, a member of the committee, dissenting from some portions of the report.

PASSENGER CAR ENDS AND PLATFORMS.

The committee considers it unwise and indeed impracticable to do more now than to report progress and asks to be continued. Nothing complete can yet be presented to cover the many conditions. The United States Government requires that ends and frames of postal cars be strengthened and provided with vestibules, and has issued instructions describing somewhat how this shall be done. Some of the railroad companies are trying to meet these requirements; others are debating the advisability of doing away with the platform on all kinds of passenger train cars that do not require accommodation at their ends for passengers; or at least making a very small platform by extending the main floor framing a short distance. Improvements are being worked out in other directions as in the use of iron and steel in end framing, the fastening of the usual platform to the car body, the attachment of the coupler, etc. For all these reason and others a definite report now seems impracticable.

Mr. F. D. Adams, of the committee, presented a letter in connection with the report, in which he expressed his views as differing from the committee as to increasing the dead weight of the car by putting on an additional amount of iron, particularly on the end of the car, where the weight is most objectionable, weakening the car where it should be strong, in consequence of the overhang from the bearing on the truck; the theory of the committee being to make the part extra strong by additional ironing, and avoid, as they claim, telescoping and breaking up the ends of the car. He then proceeded to consider what it would cost for the extra weight, of no value, as he claimed, to the carrying capacity of the car, and alluded to the cost it would be to the railroad companies in hauling the extra dead weight, which he estimated at half cent per ton per mile. His road being 200 miles long, every extra ton hauled would cost $1. If the car were three tons heavier, it would cost $3 per trip. Supposing a car to make 300 trips a year, allowing two weeks for the car to be in the shop, the extra expense would be $900 yearly for each car. Having 500 cars, it would amount to $450,000. Incidentally he referred to the objection to short end platforms for passenger cars, and held that it would not be practicable to adopt them in that service.

On motion the reports were received and the committee continued.

MR. RHODES: I did not catch the last part of Mr. Adams' objection to the platform matter. If I understood him correctly, he found that some lines are putting stoves and washstands on the platforms.

MR. ADAMS: Some plans given us by the United States Government showed the heater on one platform and the washstand on the other; showing that while they are willing to pay for a 60-ft. car they want to occupy 5 ft. on the platform, and have it enclosed by a vestibule, which they do not seem to be willing to pay for.

MR. GRIEVES: We are building five postal cars where the platforms are only 12-in. from the end of the car, and formed by the main frame of the car. They are 60 ft. long; no platform, except the 12 inches, which is a projection of the frame. Our company contemplates building the same class of car for express and baggage service; it will do away with tramps riding on the platform.

MR. ADAMS: I agree in the main in regard to building baggage and express cars without platforms; but not passenger cars. I object to increasing the weight of our cars. My experience has shown me that our passenger cars are abundantly heavy to do the service.

The report of the Committee on Coal Car Sides was read by Mr. Higgins.

COAL CAR SIDES.

The committee is of opinion that the most economical and efficient method of staying the sides of 60,000-lb. coal cars is by a transverse tie rod near the top, protected by angle iron, as shown in Fig. 1. When this construction is prohibited because of the necessity of carrying lumber, etc., two stakes on each side and near the middle are recommended, these to be below the side sills, supporting them by castings having a bearing against the sides of the hopper bottoms, as shown in Fig. 2, or some equivalent construction. When the car is loaded the weight will help to keep these castings out to proper position The committee recommends that stakes be made as deep as practicable and spaced closer together near the middle than toward the ends of the cars, also that stake pockets have a little draw when stakes are new. The committee has failed to discover that any of the patented devices for staying the sides of coal cars are superior to the two methods here recommended.

Mr. Barr moved that the report of the committee be received and the committee discharged. (Carried.)

MR. MITCHELL: I do not think recommendation No. 2 is going to be effective. A method not shown here is far superior to either one shown; and that is, having truss rods go up the sides, to a point about half a foot below the top.

MR. HIGGINS: The committee received a number of blue prints from some of the most prominent roads in the West that have been using the method of supporting the stakes by running them down and butting them up against the cross-tie timbers; and claim that has given good results; but this arrangement, we learned, was probably a patented device, and we, therefore, recommend that the castings be placed on the side of the hopper. I do not agree with Mr. Mitchell as to the truss rods, as there are objections to that arrangement, in that if you place the truss rod high enough you are liable to interfere with the clearance.

Fig. No. 1.

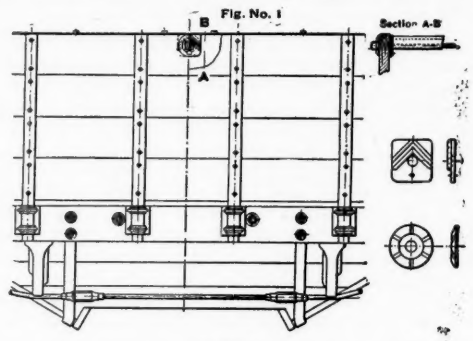
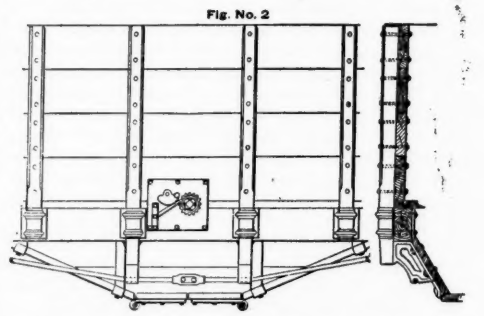


Fig. No. 2.



MR. BARR: I think some of the Western roads that reported extending down to the cross timbers do not use as high sides as are used in the East in handling hard coal, on account of the way the chutes at the mines are constructed. The experience of fastening to the cross-tie timber, so far as the Western roads are concerned, must be taken with some allowance.

MR. GRIEVES: The construction shown here would work all right for the hopper of the gondola car, but not for an ordinary coal car in the West. After we had about 5,000 cars built with the two center stakes above the cross-tie timbers, and extending over the tie timbers, we heard that this method was an infringement of a patent but subsequently learned that it had been used by some road in the Northwest before the date of the patent; and we are now using this construction when we alter our old cars; it holds up the sides and prevents them from bulging out. Our cars are from 36 to 40 in. high; 34 ft. car.

MR. MORRIS: We use on our line 4,000 Hopper bottom cars, and our last cars are 60 in. high. We used the side truss for a good many years, but we found that it did not do as well as the tranverse rod, which answers the purpose admirably.

MR. MITCHELL: We had a good many cars where the side boards overlapped the end boards. We changed our construction as the cars went in the shop, so that the end boards overlap the side boards, and then put the corner casting in so that the projection went through the end board; and have had no springing whatever of the end boards.

MR. BARR: I ask Mr. Grieves what experience they have with the cars made with a sort of round kettle?

MR. GRIEVES: What we call the "pot hopper" is the best coal car of the kind that was ever built; that is for light power, and where they run in trains exclusively by themselves. The only trouble was the action of the coal on the iron; it would eat it out in a short time. The Baltimore & Ohio has done a great coal business in those cars.

MR. SANDERSON: The Norfolk & Western used the side truss rods a long while on deep hoppers, and found them unsatisfactory. Empty, the cars would look all right, but loaded they would bulge. It was impracticable to keep the side truss up in proper shape. We now use on all deep hoppers one or two cross braces, made out of oak, and strapped on the top with iron bars.

A report of the Committee on Wheel Gages appointed to confer with the American Railway Association was called for.

MR. BARR: A conference was held with the committee of the American Railway Association, and further action was deferred by mutual consent until the Pennsylvania road made their experiments on the relative merits of the 4 ft. 9 in., or 4 ft. 8½ in. on the present gage of wheels.

The Executive Committee recommended that the standard size of postal cards be changed from 3½ × 5½ in. to 3¾ × 6½ in., to conform to the new style adopted by the

United States Government, and on motion the change was adopted.

The President appointed the following committee on subjects for the meeting of 1897, to report at the meeting of 1896: Messrs. Waitt, Soule, Rhodes, Hennessy and Chamberlain.

The Committee on Correspondence and Resolutions presented a resolution thanking the various companies and individuals who have added to the comfort and success of the convention.

Mr. Adams moved that Article I. of the By-Laws be changed so that the regular meeting shall be held on the second Wednesday in June instead of the second Tuesday in June. (Carried.)

On motion of Mr. Waitt, the Secretary was instructed to cast the ballot of the Association for the following officers: President, John S. Lentz; First Vice-President, S. A. Crone; Second Vice-President, E. D. Bronner; Third Vice-President, J. C. Barber; Treasurer, G. W. Demarest. New members of the Executive Committee: R. H. Soule, H. S. Hayward, A. E. Mitchell. Mr. John W. Cloud was re-elected Secretary.

The following places were suggested for holding the next meeting: Niagara Falls, Old Point Comfort, Chicago, Ill.; Saratoga, Atlantic City.

An informal vote was taken on Saratoga, which resulted as follows:

In favor, 14; opposed, 26.

The vote on Niagara Falls was:

In favor, 21; opposed, 9.

Mr. Barr suggested that the members consider the advisability of changing the date of meeting to some time in the fall, when the meetings might be held in the large cities of the country.

CONVENTION NOTES.

At the meeting of the Railroad Supply men, held in the Convention Hall June 15, the following gentlemen were elected the chairmen of the various committees, to serve during the convention of the American Railway Master Mechanics' Association: Finance Committee, Geo. T. Evans; Entertainment Committee, Edward C. Bates: Printing Committee, J. Alexander Brown; Flower Committee, W. E. Bryant; Committee on Boats and Fishing, A. J. Sehrvens.

Mr. C. L. Sullivan, of Chicago, one of the representatives of the National Malleable Casting Company, is quite ill. It is thought that he has appendicitis. He was taken sick while out fishing last Saturday, and has been suffering greatly since.

On Saturday, there being no business, most of the guests went fishing, sailing, or made excursions in the numerous steam yachts. In the afternoon there were races between the St. Lawrence river boatmen, and a greased pole was put out on the dock with a $10 bill on the end to tempt the natives. As it was greased with the Union Grease Co.'s grease, many ineffectual attempts were made before the prize was gained.

The grand M. M. ball was held on Tuesday, June 18, at the Thousand Island House, in the dining room.

Memorial services for those members who died during the past year were held in the parlors of the Thousand Island House on Sunday evening.

EXHIBITS.

The Acetyline Gas Equipment Co., of New York, have an exhibit of their car lighting system on the office floor of the Crossman House.

A working model of their freight car door is exhibited by the Moore Car Door Company, of Chicago.

The Cleveland Steel Casting Company, of Cleveland, O., have an open hearth cast steel gear milled and turned.

An exhibit of their drive log screws, track bolts, brake pins, boiler patch bolts, coupling pins, etc., is made by the Simonds Rolling Machine Company, of Fitchburg, Mass. All of the articles in their exhibit are rolled instead of drop forged, the track bolts being entirely finished to the threading by rolling.

Edward Smith & Co., of New York City, varnish makers and color grinders, exhibit the kettle in which varnish was first made in the Western Hemisphere.

A full size exhibit of their patented Acme coach window shade, and a model showing the principal features of the construction, are exhibited by the Adams & Westlake Company, of Chicago.

The Crosby Steam Gage & Valve Company, of Boston, Mass., show their own and the Meady muffled locomotive pop safety valve, improved pressure gage, steam whistle, and a pair of their indicators with the electric attachment for indicating two cylinders simultaneously.

An open hearth steel cast driving wheel center weighing 1,620 lbs., cut through the rim on each side of one of the spokes, which was then twisted a quarter of a revolution to show the quality of the steel, is exhibited by the American Steel Casting Company, of Thurlow, Pa.

The Consolidated Safety Valve Company have an exhibit of the Richardson pop safety valves and Richardson patent locomotive muffler valves, the Tabor indicator and a half section of the Metropolitan injector.

A full size aluminum model of the Park automatic coupler is exhibited in the office of the Thousand Island House by Mr. W. A Stowell, general manager of the Montpelier & Wells River Railroad.

The Boies Steel Wheel Company, of Scranton, Pa., exhibit half sections of their steel-tired car wheels with forged wrought iron centers, also one finished and one unfinished centers for the same.

The Westinghouse Air Brake Company, of Pittsburgh, Pa., have two of their air-brake piston replacers attached to air-brake cylinders mounted on a carriage.

Samples of the Defiance improved asphalt car roofing are exhibited by the A. E. Filley Manufacturing Company, of New York.

A wooden model of their coupler is shown by the Connecting Bar Coupler Company, of Des Moines, Iowa.

The Columbian Metallic Rod-Packing Company, of Philadelphia, Pa., have an exhibit of their sectional metallic packings for piston rods of steam and air cylinders.

A full size working model of the Pero patent automatic car axle lubricator, and also one of their oilers that is said to have made 20,000 miles, is shown by the Pero Automatic Car Oiler Company, of New York.

The Standard patent car seat and foot rest combined is exhibited by the Standard Patent Car Seat Company, New York.

Photographs of the Russel snow plows are shown by the Ensign Mfg. Company, Huntington, W. Va.

The Alexander Car Replacer Co., of Scranton, Pa., exhibit a working model of their replacer, and a small car, which is used to illustrate the use of the replacer. They also show full sized samples of their replacer. This device was fully described in the *Railroad Gazette* of Feb. 15, 1895.

The Tyler Tube & Pipe Co., of Washington, Penn., manufacturers of knobbled charcoal iron boiler tubes, exhibit a large sample of a hammered iron bloom, samples of bent tubing, etc.

O G. Temple, Russel, Ky., exhibits the L. Sennett automatic air hose coupler, showing the method of automatically coupling the air and steam connections on cars, by means of working models.

Pratt & Lambert, of New York and Chicago, manufacturers of the "faultless" carriage and railroad varnishes, show samples of wood treated with their patent wood filler, and their varnishes.

Bly & McKeen, 143 Liberty street, New York, exhibit their positive safety attachment M. C. B. coupler by means of a full sized model. (See *Railroad Gazette* of June 14 for description.)

A. Major, of 461 Pearl street, New York, has on exhibition several of his ice floats and his automatic overflow pipe for water-coolers. In addition to this, an exhibit of his patent cement is made by means of the usual cemented plate and weight.

The Chicago Grain Door Co., of Chicago, have an exhibit of lock brackets for car doors and a model showing the construction and operation of their patent grain door and door latch.

The Ludlow Coupler Co., of Springfield, O., has an exhibit composed of a full-sized tender coupler, and a car coupler mounted on sections of center sills.

E. C. Inderlied, of Rock Rift, N. Y., has on exhibition his patent coupler for freight and passenger service. This coupler is intended to act as a buffer also.

The Syracuse Malleable Iron Co., of Syracuse, N. Y., exhibit the Burns coupler, showing full sized couplers mounted on trucks, so as to illustrate their operation in service.

Jenkins Bros., of 71 John street, New York, exhibit a full line of valves of all kinds, sheet packing, etc.

Samuel Hall's Son, New York, exhibits a pipe wrench, described in the *Railroad Gazette* for Feb. 15, 1895.

The Foster Engineering Co., of Newark, N. J., exhibit samples of reducing valves, boiler and injector checks, pressure regulators, pump governors, etc.

The Scarritt Furniture Company, of St. Louis, Mo., have an exhibition of their well known car seats.

The Geneva Agency Company, of New York City, have on exhibition a section of the Smith triple expansion exhaust pipe for which they are now prepared to give a guarantee in the saving of fuel.

Several large perforated metal sheets for locomotive spark arresters and deflecting plates, also numerous small samples showing the different styles of perforations, are exhibited by the Hendrick Manufacturing Company, of Corbondale, Pa.

M. C. Hammett, of Troy, N. Y., has a Corey force feed lubricator arranged so as to show how the oil is supplied by it to the eccentrics, links, truck and driving wheels The lubricator is placed in the cab and by means of copper pipes the oil is furnished to the above named parts while the engine is running at full speed.

Brown Sharpe Manufacturing Company, of Providence, R. I., have in the pavilion a set of photographs showing their milling, grinding, chuckling, gear and screw machines, also blue prints of their special tools for milling locomotive pedestal gibs and wedges.

The Detrick & Harvey Mfg. Company, of Baltimore, Md., have a small model of their No. 6 single or 2½ in. threading machine cutting threads from ¾ in. to 2½ in. They also make a specialty of open-side iron planers.

E. Harrington Son & Co., of Philadelphia, Pa., have in their exhibit a small working model of their screw hoist with the latest improvements, also a complete set of photographs of the tools applicable to railroad-shop work. These include locomotive gang frame drills, stay bolt nicking machines, car-journal box drilling machines, extension bed engine lathes, pipe cutting and straightening machines, radial and gang drills, and portable hole trimming machines.

S. Vessat & Co., of Joliette, Que., Canada, have their oilers for steam and electric car axle journals.

The Baird Pneumatic Machine Company, of Topeka, Kan., have two of their rotary air machines for drilling, reaming and tapping stay bolt holes, and also for screwing in stay bolts.

The Standard Steel Works of Philadelphia, Pa., have on exhibition a section of a car wheel with a steel-tire held with two retaining rings.

The American Balance Slide Valve Company of San Francisco, Cal., have two locomotive slide valves to which has been applied their beveled packing rings and discs. One has a single ring and disc, while the other has two of each, the application of them being determined by the amount of clearance in the steam chest, a single ring being necessarily of a greater diameter in order to secure the proper balanced area. This patented device is now in use in sixty-three railroads in the United States, Canada, Mexico, Central America, Germany, Switzerland, Scotland and France.

The Standard Paint Company of New York City have samples of their P. & B. ruberoid roofing. They have just received another large order for their insulating paper, to be used on cars of the Merchants Despatch Transportation Company.

A coupler of the M. C. B. type, with the head detachable from the shank, is shown by the Penn Steel Casting and Machine Co., of Chester, Pa. The head instead of being pivoted to the shank by a pin has lugs which fit into corresponding grooves on the shank, thus avoiding the weakening of the coupler by the hole for the pin.

The Oswego Tool Company, of Oswego, N. Y., have an exhibit of their different styles of boiler tube expanders, wrenches, stay bolt taps and steel screw punches.

The Fox Solid Pressed Steel Co., of Chicago, has its trucks on exhibition upon five New York Central 60,000-lb box cars, now standing at Clayton. These cars were built by the Michigan & Peninsular Car Co.

The Facer Forged Steel Car Wheel and Locomotive Wheel Co., of Germantown, Philadelphia, make an exhibit of a steel car wheel forged entire from a solid ingot of open hearth steel. This is something entirely new in car wheel construction, and shows a radical departure from the usual steel tired wheel, with a center separate from the tire.

Presidents Garstang's Address.

The annual address of President William Garstang at the opening of the convention of the Master Mechanics' Association at Alexander Bay, June 17, was, in substance, as follows:

The first topic was the change in the business outlook. The prospects of the railroads are now flattering, and as a natural result they are increasing locomotive and car equipment. He then spoke at some length of the great strikes of last year and of the important and delicate relations between the railroads and their employees, glancing at some of the plans proposed for securing and maintaining better relations, and saying that some plan must be devised to prevent instead of crushing the oft recurring and disastrous strikes.

Mr. Garstang then spoke of the matter of discipline, calling attention to the papers of Superintendent Gibson, of the Big Four System, and Superintendent Darlington, of the Pennsylvania Lines, saying that Mr. Darlington's idea is well worth consideration.

The conditions now before the motive power department are especially arduous. Speed and tonnage must be increased and at the same time the percentage of cost, of maintenance and operation must not grow.

The speed of through passenger trains on nearly all the trunk lines has been scheduled to 40 or 45 miles per hour. To meet those conditions it has been found necessary to construct new locomotives.

In the designing and construction of high speed locomotives, the most desirable features are: large boiler capacity with heating and grate surface in due proportion; large driving wheels; light reciprocating parts and large bearing surfaces for the journals. As the limit of speed and power depends on the capacity of the boiler to furnish steam, it seems of vital importance that the heating surface be as large as the weight will allow, and the grate surface of sufficient area to permit of a fairly slow and consequently economical rate of combustion. The type of boiler best adopted to meet the requirements mentioned seems to be the "radial stay wagon top," because of its large water capacity and steam room, and its lighter weight for a given amount of heating and grate surface as compared with other types of boilers.

The use of steel instead of cast iron for large driving wheels has increased during the past year, with the result that the weight saved, by making them of steel, has been used to increase the size of boiler, thereby getting a boiler with increased capacity and with no additional weight on the track. There seems to be a gradual drift of opinion in favor of large driving wheels for fast passenger engines. With a large wheel the piston speed is moderated and the result is a better distribution of steam and less wear on frictional parts than can be secured with smaller wheels. The year past has seen the advent of a number of fast passenger locomotives of the eight-wheel type, with 20 × 24-in. cylinders, carrying 190 lbs. steam pressure and not exceeding 125,000 lbs. in weight. These are giving excellent results. With this construction the ratio of adhesion to tractive power is less than four, the figure recommended by this Association. When under speed the adhesion is ample for the maximum tractive power developed. In starting the sand blast overcomes any serious trouble from slipping. Until our rails and bridges are made to stand the weight and shock from heavier locomotives the lack of adhesion at starting will have to be overcome by some such device as the sand blast. The cylinders of the high-speed locomotives should be well protected, and the steam and exhaust openings as large and as free as possible. The length of ports and the travel of valve should be made as great as practicable without throwing too much strain on the valve gear. We have found the Allen valve advantageous in high-speed engines, as it doubles the steam admission openings at short cut-offs. Inside clearance and setting valves to reduce the lead at short cut-offs, correspondingly reduces compression and gives us greater power at high speed, and also makes the engine ride easier. Much has been accomplished in the direction of light reciprocating parts by the use of four-bar steel cross heads cast with hollow wings, hollow wrist pins, dished cast steel pistons and channel main rods, thus correspondingly reducing the counter balance and its effect on the track at high speed. In order to get the largest boiler consistent with the total weight it has been found advisable to use cast steel driving wheels, hollow crank pins, steel foot plates and other parts, thus reducing unnecessary weight. The reduction thus obtained in a certain engine lately constructed approximates between 30 and 40 per cent.

The same consideration applied to freight engines will no doubt prove equally advantageous.

From various sources of information we get good reports of the economy of compound freight locomotives. I have personal knowledge of a compound freight locomotive that has shown a saving of 23 per cent. in pounds of coal per car mile, as compared with the performance of 10 simple locomotives, which, excepting the compound principle, are identical in construction, dimensions and weight. The performance of these locomotives was taken for a period of nine months. The expense of repairs to the compound, as compared with simple locomotives, is no greater and when a longer period of time has elapsed, I expect to find the cost of repairs to be less than that of a simple locomotive.

The important subject of exhaust nozzles and steam passages will be reported on by an able committee. The economy of a locomotive largely depends upon the proper proportion of these parts, and for the want of exact knowledge there are many locomotives running to-day handicapped by defective nozzles, steam passages and draft appliances. Let us apply the knowledge gained from the committee's report to remedy this state of affairs.

The question of economy in shop practice is of vital importance, and in these days of enforced retrenchment we must meet the requirements of such practice. How many of us would look slightingly on the dispensing with even one laborer at the rate of $1.25 a day in considering the retrenchment nessary in our department? Yet the pay of that one laborer is equal to the interest on $8,000 at five per cent. per annum. The saving due to dispensing with laborers, if applied to the purchase of overhead cranes, air hoists and other labor-saving devices, will make a good return on the money invested.

The President then spoke of the associations of the Traveling Engineers, Master Car and Locomotive Painters and Air Brakemen as being kindred associations, good educators and directly beneficial to the railroads. For several years he has encouraged his own staff in attending the conventions of those organizations. He closed by mention of the members who have died since the last meeting, namely, J. N. Lauder, John I. Kiehner I. C. McNeven, W. H. Selvy and W. T. Small, one of whom was a Past President and a pioneer of the association.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Last week the newspapers contained a very circumstantial statement to the effect that the Manhattan Railway Company had closed a contract with the Westinghouse Electric & Manufacturing Company for equipping its system for operation by electric motors. We have official information that no such contract has been made. It is quite possible, however, that a contract for electric motive power may be made within a year, and in that case the cars would be lighted and heated, as well as hauled by electricity. We judge that there is no question as to the final outcome, although this change may be delayed even more than a year, for it is a very expensive one and will involve the loss of a good deal of money invested in locomotives. This is the sort of service in which economy can be realized by electric haulage and the advantages of cleanliness, quietness and convenience are all on the side of the electric motor.

Gross earnings for May show continued improvement. The *Chronicle* makes the gain over May of last year 6.38 per cent., the aggregate being 39½ millions for 132 roads. *Bradstreet's* figures show a gain of 6.5 for 123 roads, with aggregate earnings of 38 millions. In April the gain was about 4½ per cent. For the five months it is nearly 2½ per cent. The May comparison is made with a very bad month indeed. Last year the comparative loss in May was 17½ per cent. It was a month of coal strikes, floods and Coxey; and there is not much to brag about in showing a gain over such a month. A gain of 6½ per cent. is a great deal better than a loss, and may at least be taken as a confirming a hundred other signs of returning prosperity: but it ought to have been more. Information from many different sources leaves little doubt that rates were badly demoralized in many territories most of the month, so that the small increase in earnings is not a fair measure of the business done; and this fact largely destroys the value of returns of earnings as evidence when we are seeking to ascertain the real condition of business. The efforts to maintain stable and uniform rates are serious and honest, but certainly they are only moderately successful.

The twenty-seventh annual convention of the American Society of Civil Engineers assembled Tuesday evening of this week at Hotel Pemberton, Boston Harbor, with great promise of a brilliant meeting. The attendance of members and their guests is unprecedented; late estimates placed it at about 500. The list of papers is good, and the programme of excursions is remarkably attractive, including Sunday at the White Mountains. The things of engineering interest to see in and about Boston are numerous and important, and the pamphlet issued by the local committee is an excellent example of applied intelligence. It gives all necessary information as to details of ways and means, and describes at considerable length Boston and its engineering works, with numerous illustrations and with a number of good maps, the whole making a pamphlet of 80 pages. No city in the country presents so much of interest to municipal engineers as Boston, and while it is not one of the great railroad centers, it contains a good deal that is interesting to railroad engineers also; and all who attend the convention are sure to have a delightful outing and an instructive experience.

Hauling Trains by Electricity.

Two articles which have recently appeared on the very interesting subject of the use of electric motors on railroads are in substantial agreement. One is by Mr. F. J. Sprague in the June number of the *Engineering Magazine;* the other is by Mr. H. G. Prout in the *Independent* of June 6.

The conditions under which the Pope is infallible are very strictly limited. His words have this attribute only when he is speaking as the head of the church, on matters of faith and morals, and from the chair of the Pope. We hold that the editor of the *Railroad Gazette* is inerrant only under similar strict conditions. When he makes excursions in profane or foreign vehicles, he may make mistakes, like any ordinary man, and then we decline to be responsible for him. Still we are disposed to indorse, in principle, if not in detail, the opinions expressed by him in the article before us.

Both writers agree on the fundamental principle. Mr. Prout says:

"When the work can be massed in a few heavy trains direct steam will be better. When the work must be done in small quantities, and very frequently, it will be advantageous to transmute the energy of the steam into electricity." Applying this general principle. he concludes that the electric motor is destined to supplant the steam locomotive for elevated or underground city railroads; also that for surface railroads in cities it will take the place of the steam dummy, the horse, the mule and even the cable; and that it is destined to replace the steam locomotive for suburban service within a radius of something like 20 miles of the business centers of the great cities. For like reasons the electric motor will probably take the place of the steam locomotive for strictly interurban business; that is, between cities and large towns not too far apart, where frequency of service and convenience of access to cars are very important, and where the volume of business is large. Likewise for service in and about small towns where the track can be laid on streets and highways the electric motor seems to be destined to prevail.

For long distances, where, in order to get acceptable average speed between terminals, a high speed must be made between stops, a new element, hitherto unconsidered in building electric railroads, must come in. The railroad must be built on private right of way that can be fenced in and protected, and cannot be permitted to run on the open highway. The track and rolling stock must also be quite up to the standard of steam railroad practice. The tendency of recent legal decisions indicates that for service between towns railroads cannot be regarded as street railroads, but must acquire private right of way by purchase and condemnation. Considering these elements, the cost of establishing an electric railroad must be as great as that of the steam railroad, apart from any consideration of the cost of central stations and of loss of energy in transmission. Therefore, it seems highly improbable that the electric motor will drive out the steam locomotive from the great field of main line working.

Mr. Sprague lays down the general principle in these words: "When trains are operated in large units, with comparatively few units between terminal points, and these at considerable intervals, the steam locomotive will absolutely hold its own. When, however, these larger units are broken up the intervals of train dispatching can be shortened as much as is consistent with satisfactory operation and the number of units distributed over a line made correspondingly large. Then and then only will electricity be used on suburban lines and lines connecting important cities." Or, in other words, "electricity will take the place of the steam locomotive only in part, and then only when the number of units operated between terminal points is so large that the resulting economy will pay a reasonable interest on the combined cost of a central station system of conductors and a motor equipment, and the traffic existing is commensurate with the needs of such a system." Applying this principle Mr. Sprague concludes that the future of the electric railroad is not in the wholesale destruction of existing great systems; it is in the development of a field of its own. "It will fill that field to the practical exclusion of all other methods of transmitting energy. It will replace the locomotive on many suburban and branch lines; it will operate almost all street railway systems and elevated and underground roads; it will prove a valuable auxiliary to traffic systems; but it has not sounded the death knell of the locomotive any more than the dynamo has sounded that of the stationary steam engine." Mr. Sprague considers somewhat also the question of handling freight, and concludes that the 30, 40 or 50 car trains pulled by a single locomotive with a limited train crew presents an economical transportation of freight which no system of units on long distance transportation can hope to equal.

It is quite possible that some day in the distant future a set of conditions may arise which will call for the use of electric motors on main lines running comparatively long distances, as, for instance, between New York and Philadelphia. There may be a commercial demand for higher speeds than can be realized by steam locomotives. We have not yet reached the limit of speed that can be attained by a steam locomotive, but obviously the boiler and the firebox must set a physical limit somewhere. On the other hand, there is practically no limit to the amount of power that can be poured into a motor from a central station, and so the time may come when special high speed lines may be built between some of the great cities on which electric motors will be used. But in the *Independent* article the opinion is expressed that such a railroad could not live under existing conditions to-day; it would ruin its owners; but future generations may see it.

We shall not attempt now to give the arguments which lead up to the conclusions briefly stated above. It is simply a matter of collecting facts and figures and applying arithmetic, and such a process is pretty sure to demonstrate the soundness of the position taken by both writers. The subject is complicated and the only safe course for the engineer or the investor is to make a careful study of each case as it comes before him. But the one general principle that can be always applied, within limits, is laid down above.

The Proposed Block Signal Rules.

The St. Louis convention comes up once more, in a communication from a correspondent. He says:

I have read your report of the St. Louis meeting of the American Railway Association, in the issue of June 7, with your comments thereon. While the majority of the gentlemen present had evidently determined, before the reports were taken up, that nothing was to be gained by further discussion of the Train Rules, and while, therefore, the train rule committee, and members holding their views, will take little interest in your criticisms, it is only fair to say that your strictures upon the committee's work are well within the truth. Some of the best operating officers who were present at the convention will criticise you chiefly for the mildness of what you say. But the block signal rules, which you do not criticise, are really more important than the train rules. The latter have now been threshed over so many times that, much of the time, discussion of them runs into idle talk about non-essentials. The signal rules, however, touch upon a live question, for blocking signaling is now in a progressive state. Are we to infer from your report of this part of the meeting that the discussion did not bring out any useful information? The report of the committee, printed before the meeting, showed some rules which will certainly need amendment before any road will accept them; such, for instance, as 228.

We made our report of the block signal rules brief because the discussion upon them brought out little or nothing that would help one to form an opinion upon the value of the rules themselves. We postponed discussion of them because we had not had time to examine them carefully; and now it appears that they were "adopted" with a reservation, for the new edition of the standard code appears without them. This omission was proper, of course, for the Association ought to consider *all* of the rules for this department before finally settling upon those for one part of the signal code. Moreover, the discussion on this subject came at the close of the two days' meeting, when the members were not in the mood for thorough discussion, and the value of what was said is correspondingly diminished.

The rules themselves are subject to various criticisms. We do not know what ones our correspondent refers to, other than 228, but the two most obvious criticisms are general in their nature. First, as to the rule, acknowledged by the committee as binding, that this part of the code, like all the rest, should deal with principles and not precepts. This rule is followed in a very irregular way. Rule 204 (the second form suggested) reads:

204 (B). When notice is received of an approaching train the signalman will notify the signalman in advance, and ascertain if the block is clear and "red" displayed; if so, he will arrange with the signalman in advance to hold the block for ——, and admit the train to the block.

When the engine of a train has entered a block the signalman will report to the signalman in advance, and when the rear of a train has passed —— feet within the block, and he has seen the markers, the signalman shall display his signal at "danger" and report to the signalman in the rear.

The phrase "He will arrange," etc., states a principle where a precise formula would have been particularly appropriate. In other rules, No. 205 for instance, there is a direct precept, but an absence of a principle, the need of which is obvious.

Second, the rules for signalmen might be made much easier to teach (and to understand) by the use of a simple diagram, and the indications of the signals could be made ten times plainer by drawings. To insist on telling everything in words is an unnecessary adherence to tradition. This point is illustrated in the English signal rules, printed in current issues of the *Railroad Gazette*, where "the signal box from which the train has arrived," "the signalman at the box in advance," "the signal box from which the signal was received," and many other equally clumsy phrases are repeated scores of times, when "*A*," "*B*," and "*C*" would answer just as well if there were a drawing to explain them. The employee who cannot fully and quickly comprehend a diagram of tracks, explaining the relations of three signal cabins is not fit for any place where these rules are required.

While criticism of the rules in detail may be of little value at present, on account of the probability that they will come up again in the convention, two or three obvious points may be noted. Rule 228, referred to by our correspondent, is applicable on double track only. At the same time the note under Rule 204 indicates that the committee intended to provide for both single and double. No. 228* could be made applicable to either by filling the blank space, for use on single track, with, say, "one week" instead of "five minutes," and by adding a clause making exception for ruling trains; but when the construction of a standard code involves such a combination of modifications as this, the question arises whether making rules with blank spaces really accomplishes the object aimed at. In many cases it does not.

The second paragraph of Rule 204 will not be acceptable to roads where signals go to danger immediately after the engine has passed them, and the question as to best practice in this respect, which was discussed a little at the convention, ought to be thoroughly thrashed out. The criticisms of Mr. Fitch on this and other points deserve more attention than they received. Rule 202† suggests in a striking manner the absurdity of painting semaphore arms red; Perhaps, however, this wording will serve to show more clearly the desirability of using yellow or some other color that has no meaning. Again, it is not apparent what advantage there is in trying to make a single rule answer for both three-position and two-position semaphores. The two practices are not likely to be used at the same tower, or even on the same division. The first form of rule 204 (for double track only) permits A to send a train to B without first asking B. Why should he not ask, as is required in England? According to the rule, A assumes that, because the line was clear, say, two hours previously, it is clear now. This may not cause trouble once in a hundred years, but the English procedure tends to keep the discipline up to the mark.

We have noted points on which there are radical differences of opinion. Other differences might be mentioned which we do not consider so weighty, but which the roads using the block system would maintain with a good deal of tenacity. It seems likely, indeed, that the Pennsylvania, the Erie and the New York Central will each continue to prefer their own respective codes.

A New Digest of Railroad Law.

Some years ago the legal world would hardly believe that there existed in one of the suburbs of New York city an establishment of such dimensions as to contain within itself not only the mechanical but much of the intellectual machinery necessary to issue the greatest law encyclopedia of modern times. And yet it is quite capable of demonstration that at Northport, Long Island, this stupendous work, already comprising 27 volumes, including topics from the law of "A" to the law of "Usury," is issuing from the publication house of Edward Thompson and his company. Before we have recovered from the surprise at such wonderful enterprise in such a modest village, we find Edward Thompson without commercial publication ancestry of any sort, so far as we are informed, announcing the inception of another great encyclopaedia of perhaps even larger usefulness, that of pleading and practice.

And here almost without any announcement at all we have before us from the same publisher two large volumes of a digest of railroad decisions, the second of which has but recently made its appearance. Mr. Thompson seems to be a pioneer in his undertakings, and in the methods of carrying them out. He appears to have organized an editorial staff of competent and trained legal minds, and to have them under fixed contracts for all their time, in proximity to the printing establishment.

The first railroad case was decided within the memory of men now living, say sixty years ago, but the first attempt at a railway digest, strange as it may seem, was not made before 1875, when Mr. John F. Lacey, of Iowa, issued the first volume of his admirable work. The second volume appeared in 1884. Mr. Lacey's excellent work, stopping in 1884, contained about 20,000 law points, while the work now before us, being published a little over ten years later, is said to contain about 75,000.

Thompson's first two volumes and, we presume, those to follow, have been prepared by Messrs. Stewart Rapalje and William Mack, the former of whom, at least, has been before the public for some years back as an industrious and discriminating law writer. The topics treated so far extend from "Abandonment" to "Cities," and cover over sixteen hundred large pages. So that so far as the space required in treatment is evidence, we may justly conclude that this work, when finished, will be the most complete and exhaustive hitherto published.

Of course mere bulkiness in a work of this kind is not its greatest value. When a man sits down to ascertain what the courts have decided about a certain thing, he wants to learn *all* that has been decided in a certain case as well as what has been decided by all the courts. A little learning, it has been well said, is a dangerous thing. These volumes are distinguished by clearness of statement and thoroughness of statement of the point decided. Clear statements are often incomplete, as, for instance, in sensational press dispatches summarizing important decisions, from which an untrained reader would infer about 300 times a year that the Balance of Justice had gone down so far on one side that its equilibrium could never be recovered.

And it is equally true that thoroughness or fullness of statement in digests of points decided is not necessarily clear. The maker of the syllabus may crowd into it every circumstance and detail in evidence essential and unessential to the point decided, and so completely cover up the idea as to lose it in a haystack of verbiage. This is a very common imperfection in digests and makes the work of consulting them threefold more toilsome than it ought to be. In the work before us these matters have received due consideration and the result is admirable.

As an instance of the satisfactory digest of a general rule we quote the syllabus, as gathered from a Texas case under the interesting sub-title, "Improper Remarks by Counsel," taken from this work: "The argument of counsel in addressing a jury should be confined to a discussion of acts in evidence, and when language is used relating to matters not in evidence, and of a character calculated to inflame and prejudice the minds of the jurors against the adverse party, the judgment will be reversed, especially in a case where the verdict seems excessive."

Glancing at the treatment of the various topics more particularly, we note with pleasure the satisfactory character of the work done. For example, under the head of "Agency," which is a most important topic in railroad law, we find, first, a number of cross-references to various parts of the work, more or less cognate, and then the subject divided very naturally into the four titles of "Appointment and How Proved," "Rights, Powers and Liabilities of Agents," "Rights, Duties and Liabilities of Principals," and "Public Agents." There are 119 sub-titles on this general subject. Take, again, the word "Animals." After cross-references, the subject of "Injuries to Animals" is divided into "Statutes," "Liability Irrespective of Company's Duty to Fence," "Liability as Dependent upon Company's Duty to Fence," "Contributory Negligence," "Procedure," and the "Effect of Operation of Road by Lessees, Receivers, etc." in connection with this subject. Here we have the enormous number of 652 sub-titles.

In spite of the fullness of the digest here, we have under the topic of "Carriage of Live Stock" 161 sub-titles, and, in addition to this, a special topic on "Cattle Guards," embracing 34 sub-titles. "Appeal and Error" is very thoroughly digested, while that of "Baggage" has 131 sub-divisions.

To appreciate the fullness of the work one must understand that a sub-title may cover a large number of points decided, and refer to a very much larger number of cases where the same principles are recognized or laid down. "Carriage of Merchandise" embraces 809 sub-titles, while "Carriage of Passengers" has 651. The treatment of these two subjects, if taken out of the digest, would each present the appearance of a volume of the average size and weight. The cross-references are unusually full and satisfactory, while the subdivision of the subjects is so logical and complete that no one would find any difficulty in getting speedily to the subject searched for. The treatment of "Bills of Lading," "Charges," "Charter" and "Injuries to Children" are particularly satisfactory and in keeping with the entire work.

The volumes are handsomely printed in good, clear type, and bound in a manner to suggest the durability of the missals of the middle ages. Judging from the two volumes already issued we have nothing but praise for the work. It will be useful to every one, whether lawyer or layman, who has occasion to inform himself upon any branch of railroad law upon which decisions are to be found. It is a great work and it is not likely to have a competitor for some time to come.

The Hon. E. Henry Lacombe, of New York City, a Judge of the United States Circuit Court, has written a letter to several of the city papers complaining of the New York Central's limit on local tickets, which makes such tickets good only until midnight of the day following their issue. It appears that the Judge's daughter bought a ticket, and, not noticing the limit, offered it at the Grand Central Station, New York City, after it had expired; and she had to go upstairs to the General Passenger Agent's office to get it redeemed. Judge Lacombe says that this rule is "a step backward; it decreases facilities of railroad travel and subjects the unfortunates who have to travel by this road to a new and unnecessary inconvenience. . . . The rules of that corporation may change, but its policy is unvarying—a policy so tersely expressed in the immortal words of one of its deceased autocrats—'the public be damned.'" The Judge's wrath seems to have risen to a high pitch; but he admits that the time limit was printed on the ticket and he does not deny that there were suitable notices in the waiting rooms telling of the adoption of the rule last January. We are sorry that Judge Lacombe does not read the *Railroad Gazette*. If he had done so he would have long since found out that many large roads have had this time-limit rule in force several years, and that hardly any complaints have been made about it. The reporters' gossip in this case brings out the point that a railroad needs to announce just what it will do, as well as do just what it announces. It appears that the ticket agent at New York would have redeemed this expired ticket if he had been asked to do so, special authority to do this having been granted after the notice about redemption was issued. But, the notice being silent on this point, and directing that complaints be addressed to the Generel Passenger Agent, the Judge's daughter climbed the stairs unnecessarily. The New York *Herald*, in trying to answer Judge Lacombe's question why the rule was adopted, says: "It is generally understood by persons familiar with the conduct of railroads that this rule was put into operation to prevent possible peculation on the part of conductors and agents. It is on a par with various other rules of railroad companies, which have no standing legally, but are of service in disputes with the general public who are ignorant of their rights in such premises." The *Herald's* railroad expert is a little off. In the first place the reference to the danger of cheating by agents in this matter is a slander upon that class. A conductor now and then is caught selling to scalper tickets that he has taken up, but we very rarely hear of a railroad ticket agent in collusion with a conductor; and it is only by collusion with a conductor that he can make money by selling tickets a second time. And as for the weakness of the rule in the eye of the law, the *Herald* reporter might ask himself why Judge Lacombe, an expert, anxious to annihilate the rule, does not say anything on this point.

In our issue of May 31 appeared the programme for excursions planned by the English railroads for the delegates to the International Congress which will soon assemble in London. We have received within a day or two a provisional programme of the proceedings of the Congress. On Wednesday, June 26, the ceremonial opening by the Prince of Wales will take place at the Imperial Institute, and in the evening a reception will be he'd at the Foreign Office by the Right Hon. James Bryce, M. P., President of the Board of Trade. The next five week days will be given up to excursions and to meetings. On the evening of Tuesday, July 2, the first banquet given by the Railway Companies' Association will take place at the Imperial Institute, to be followed by a reception. Wednesday and Thursday there will be meetings and excursions, and Thursday evening the second banquet given by the Railway Companies' Association will take place. Friday and Saturday there will be meetings, and Saturday afternoon there will be a reception by the Queen at Windsor Castle. To this the Queen has invited all the delegates. On Monday, July 8, there will be further meetings, and in the evening a banquet given by the Railway Companies' Association at Crystal Palace. Tuesday, the 9th, there will be other meetings and the closing ceremony will take place that afternoon. On Wednesday, the 10th, excursions will start for Scotland and other parts of the United Kingdom. Besides the receptions and banquets here announced the city companies, whose hospitality is famous, have invited a considerable number of delegates to dine on various days. In our issue of May 24 appeared a list of our railroads members of the Congress and of their

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* 228. A train arriving at a block station where the signalman is absent or disabled, and orders cannot be obtained, shall wait —— minutes and may then proceed as under "caution," and the conductor must report the fact to the ———— from the next block station.

†202. (a) "Red" is an indication that the block is *not clear*, and signifies *danger*.
(b) "——" is an indication that the block *is clear* and signifies *safety*.
(c) "——" is an indication that the block is *not clear*, and signifies *caution*.

Where a semaphore is used, the governing arm will be displayed to the right of the signal mast as seen from an approaching train, the indications being shown by positions as follows:
Horizontal is the equivalent of (a) as above.
Diagonal —— is the equivalent of (b) as above.
Diagonal —— is the equivalent of (c) as above.

delegates. That list contained the names of 12 railroad companies in the United States that have joined the Congress, besides the American Railway Association. We are now informed that three others have joined, namely, the Cleveland, Cincinnati, Chicago & St. Louis, the New York, Ontario & Western and the Southern Pacific. A very important fact in connection with the Congress is that it has now been settled that the Congress publications will in future be issued in English as well as in French. We venture to predict that as a result of this and of the experience which the delegates will have this summer, many American railroads will hereafter join the Congress and will be represented by delegates at its next meeting two years from now.

The Interstate Commerce Commission has issued a circular to the railroads notifying them that sections 4 and 5 of the Act of March 2, 1893, referring to grab irons and to the height of drawbars, go into effect on July 1 next. Appended to the order is a request to each road send to to the commission before July 10 a statement showing:

1. The number of freight cars owned by it on July 1, 1895.

2. The number of such cars equipped on July 1, 1895, with grab irons, hand holds and drawbars, in conformity with the requirements of said Act of March 2, 1893.

3. The number of such cars in its own repair shops or yards on July 1, 1895, for the purpose of being so equipped with grab irons, hand holds and drawbars.

4. The number of cars owned by other carriers, but in its possession, and in its own repair shops or yards for the purpose of being so equipped with grab irons, hand holds and drawbars.

5. The number of cars owned by it, but in the possession of other carriers on July 1, 1895.

6. The number of cars owned by it and on its line on July 1, 1895, and the number of cars owned by other carriers, but in its possession on said date, not so equipped with grab irons, hand holds, and drawbars, nor in its repair shops or yards for the purpose of being so equipped.

Last month a series of air-brake experiments were made on the North Eastern Railway of England. The trial train was made up of the engine, 28 ordinary carriages and vans, a saloon carriage, and a rear van fitted up with recording apparatus, a total of 30 vehicles, all running on six wheels, making a train about 1,190 ft. long. In the experimental van was a Kapteyn speed recorder working from a pulley on the axle. The tests were designed to show the quickness and other qualities of the Westinghouse quick-acting valve. When the brakes were worked "quick-acting" the stops were smooth; when worked as ordinary automatic valves jerks took place sufficient to break the couplings. We have no report yet of the particulars of the stops. Of course we are familiar in this country with similar tests made on much longer and heavier trains, but naturally our tests cannot be accepted by the Englishmen and we are glad to see that they have undertaken to find out the merits of the Westinghouse quick-acting valve on their own rolling stock.

The *Iron Age* of June 13 collects some interesting figures showing the weekly prices of Bessemer pig iron and steel billets at Pittsburgh for the present year. Bessemer pig has risen gradually from $9.80, Jan. 3, to $12, June 4. In the interval there have been a few fluctuations, but in the main the course has been steadily up. So with steel billets; the price has risen from $14.80 to $18, the latter price, that of June 4, being the highest recorded. The margin in making billets is now so liberal that the *Age* thinks "the steel works like the furnaces must be making money at a rate which promises to compensate them for the weary years just gone by." Surely we hope so. In the same issue is the monthly statement of the pig iron output. On June 1 the active furnaces had a weekly capacity of 157,224 tons. This was a trifling increase over May 1 and a slight decrease from April 1. The maximum for 1894 was reached Dec. 1, namely, 168,762 tons. The lowest point was reached June 1, 1894, namely, 62,517 tons.

The clause in the New York constitution prohibiting the use of free railroad passes by state officers gave the late Legislature of that state a vast amount of trouble. But the members, finally, in a great measure triumphed, by doing their traveling on "state business," and the state treasury paid the bills. It appears to be impossible to frame a law which cannot in some way be nullified or impaired in its efficiency.—*Baltimore Sun.*

Yes; impossible if the lawmakers themselves are the nullifiers. By a fortunate combination of chances New York State had a constitutional convention which was dominated by high-minded and public spirited men, but the Legislature of 1895 was composed chiefly of the other kind. The constitutional prohibition of passes will, probably, after it has been properly placed before the courts, actually prohibit; but to prevent wasteful expenditure of money for railroad tickets by the legislature it will be necessary to make up that body of men who will use the state's money as they would their own.

NEW PUBLICATIONS.

The June issue of the *Engineering Magazine* is a special convention number, although as there are a good many conventions going on just now, we are not quite certain which convention this is intended for. At any rate it is a fine number. The papers are: "First Principles in Railroad Management," by Benjamin Reece; "The Legislative Regulation of Railroads," by Albert Fink; "Reforms in Railroad Management," by Henry Clews; "Will Trunk Lines be Operated by Electricity?" by Frank J. Sprague; "The Architecture of Railroad Stations," by Bradford L. Gilbert; "The Advance in Railroad Securities," by Thomas L. Greene; "The Car Building Industry in the United States," by John C. Wait; A Glimpse of the Silvery San Juan," by T. A. Rickard; "The Modern Railroad Machine Shop," by H. D. Gordon; "A Review of Railroad Inventions," by C. P. Mackie; "The Causes of Railroad Accidents," by Julien A. Hall. The usual review of the industrial press with index to important articles fills 80 pages. There are also over 30 pages of half-tone cuts reproduced from photographs of scenery on American railroads, all of which are interesting and some are very beautiful and striking. Moreover, there is a fine mass of advertising, which may not be of profound interest to the readers but which is a cheerful indication of the good times coming.

Annual Report of the Chief of Engineers, to the Secretary of War, for the Year 1894. In six parts. Washington: Government Printing Office. 1894.

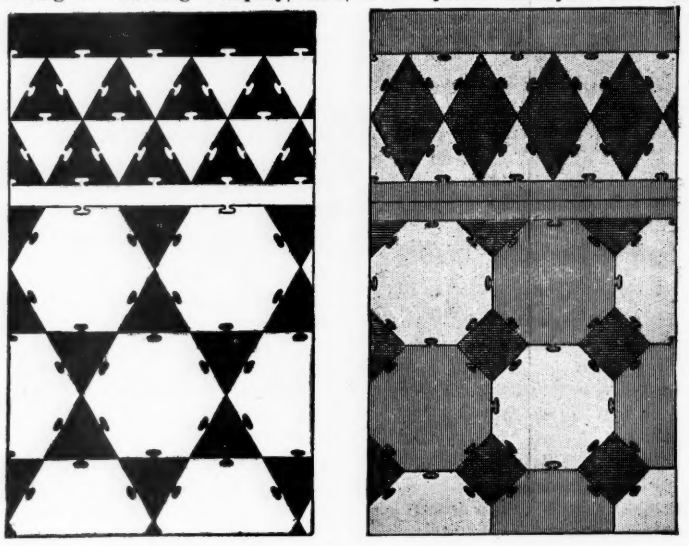
These six stout volumes, with numerous plates and index, contain the record of the Engineer Corps of the United States Army in the great and varied works entrusted to it. Of course it would be quite impracticable to attempt to say in detail what is to be found in the report. As everybody knows, the record covers not only military engineering, but a large amount of civil engineering, in the river and harbor work and various internal improvements.

TRADE CATALOGUES.

Steel Castings.—The American Steel Casting Co., of Thurlow, Pa., sends us a handsome pamphlet describing some of the castings made by that company, of open-hearth and crucible steel. Among the illustrations are a slide for a navy 13-in. gun carriage weighing over 17,000 lbs. Tests of this showed a tensile strength of 75,000 lbs., and an elongation of 25 per cent. Another large casting shown is a gear 9 ft. 6½ in. in diameter weighing 18,865 lbs. Cast steel driving wheel centers such as we have recently illustrated are also shown, as is the American cast steel bolster, tests of which we have recorded. A very large casting is a stern shaft bearing for the American Steamship Co., weighing 67,135 lbs. Specimens from this showed a tensile strength of over 68,000 lbs., elastic limit 35,800 and elongation 20 per cent. The company is prepared to make castings from 5 lbs. up to 100,000 lbs. in weight, and claims to have the largest and most completely appointed establishment for steel castings in the United States.

Interlocking Rubber Tiling.

An important addition to the large line of vulcanized rubber goods put on the market by the New York Belting & Packing Company, Ltd., is the patent interlocking rubber tiling manufactured solely by that concern.



Interlocking Rubber Tiling.

It is a close imitation in appearance of the earthen or composition tiling, and a superior article in certain respects. It is useful as a floor covering where there is danger of slipping or where there is much traffic and where noise is objectionable. Being interlocking it requires no cement in laying. It is furnished in different patterns, varying in size, shape and color, which by various combinations admit of being worked into a variety of designs and beautiful effects not only of form but of color.

This tiling yields to vibration and adapts itself to any unevenness and inequalities of floors upon which it is used, and the interlocking feature binds it together in such a manner as to prevent opening at joints. Its durability is admitted to be greater than that of composition or earthen tiling. It will not crack, break or scale, and another advantage which suggests itself is the ease with which it may be repaired.

At the Broad street station of the Pennsylvania Railroad in Philadelphia, it has been in use about a year. A total of 1,250½ sq. ft. of the material is laid there in the main building, the President's office, the passenger elevators and the business offices. We are told that it shows no signs of wear, and after each washing or scouring has the appearance of having been newly laid.

The new steamships, St. Paul and St. Louis, of the International Navigation Company, have been largely laid with this tiling. In the St. Louis the saloon decks, second cabin and pantries, etc., are all laid with this tiling as follows: Saloon deck, 2,000 sq. ft.; second cabin, 1,000 sq. ft.; pantries, 500 sq. ft.

National Association of Car Service Managers.

The sixth annual meeting of this association was held in Cleveland, O., June 18. The report of the proceedings is not yet at hand, put we give in this issue the papers read by Messrs. Bacon, Elliott and Gardner. The first two are printed elsewhere. The paper of Mr. Gardner, who is manager of the Baltimore and Washington Association, was on the general interests of the Car Service Department of Railroads. He opened by congratulating the members on the completeness with which the revolution produced by these associations had now been accomplished. The questions which caused so much friction at first have now been fought out and settled for all time.

The courts have held that a demurrage charge for detention of cars beyond a reasonable time is in the interests of all classes of the community. Nineteen legal decisions have been rendered by the courts of thirteen different states, namely: Rhode Island, New York, Pennsylvania, Virginia, West Virginia, Georgia, Ohio, Kentucky, Indiana, Illinois, Wisconsin, Iowa and Colorado. In these opinions every possible phase of the regulations has been so fully covered that there can hardly a case come up which has not been anticipated and passed upon. The present favorable situation, however, can be maintained only by the closest watchfulness. Let the application of the rules once be relaxed or abandoned, and every customer who has paid demurrage to any extent during the past five years would consider it his sacred right and bounden duty to get even with the railroad company by making use of cars as long as might serve his interest, in which case the last estate would be truly worse than the first.

Mr. Gardner thinks that the per diem plan of payment for cars interchanged is likely to be adopted at no distant day; when this comes the Car Service Associations will be found to be even more useful to the railroads than they now are. It is also probable that the general use of per diem will reveal the necessity of including under the operations of the regulations, export trade at the seaboard terminals. I have never been able to see any good reason why this might not be done with great advantage at Boston, New York, Philadelphia, Baltimore, Newport News and Norfolk by concerted action of the roads interested. Certainly these roads will not be willing to allow the present unlimited detention under per diem without some charge to shippers for detention beyond a reasonable period.

Speaking of the great necessity of making better use of freight cars, the speaker quoted Colonel H. S. Haines:

"That our stock of 1,000,000 freight cars should average no more miles a day than a freight train can run in an hour, and that, too, loaded to only one-tenth of their capacity, is not creditable to our transportation and traffic officials. There is no problem of a more pressing character." These are weighty words, which sound the keynote of a tremendous reform.

Railroad detention of cars after they are unloaded ought to be looked after more closely than it is. Car service reports ought to show a complete record of the local detention. This would be feasible to arrange, without much additional labor or expense. This information could be put in an additional detention column in our reports, and would be of value to superintendents, train masters and dispatchers in locating delay.

English Block Signal Rules.

[*Continued from page* 387.]

We continue from the issue of June 14 the reprint of the uniform code for signaling trains by the block telegraph system recently adopted on the principal railroads of England.

We intend to publish a limited number of copies of this code entire, on a large sheet, and we shall be glad to send a copy of it to any reader who requests it.

7. *Engines Coupled Together.*—Whenever it may be necessary to detach one engine from another on the main line, *the driver of each engine* requiring to be detached must, *before uncoupling*, verbally communicate with the signalman and make him clearly understand what is about to be done, and in what direction the uncoupled engine or engines will proceed.

8. *Ballast Train Requiring to Stop in Section.*—When a ballast train has to stop in a block section for permanent-way purposes, the signalman must give the prescribed "Be Ready" (or "Is Line Clear?") signal, and the signalman at the box in advance must give permission for the train to approach his box in accordance with Rule 5. When a ballast train which has been signaled as a through ballast train, requires to stop in the Section for permanent-way purposes, and comes to a stand at a signal box to enable the guard to inform the signalman that his train is going to stop on the main line in the section in advance (*see Rule 320 in the book of Rules and Regulations*) the signalman must give the "canceling" signal, and when the signal has been acknowledged he must signal the train as a "ballast train requiring to stop in the section."

9. *Platelayers' Lorries Going Through Tunnels.*—When it is necessary for a platelayer's lorry to go through any of the tunnels specially enumerated in the appendix to the working time table as coming within the application of this rule, it must be signaled on the block instruments in accordance with the authorized code, and the signalman at the box in ad-

vance must give permission for the lorry to approach his box in accordance with Rule 5. No train must be allowed to enter the tunnel on the same line until the "train out of section" signal has been received from the signal box in advance, to indicate that the lorry has left the tunnel and has passed the next block signal box, or been taken off the rails Should the lorry, after passing the tunnel, be removed from the rails before reaching the next signal box, the ganger must go forward and inform the signalman that the lorry is clear of the line.

If, however, time would be saved, the ganger must return to the signal box in the rear and inform the signalman that the lorry is clear of the line; the signalman must then send the "cancelling" signal to the signal box in advance.

10. *Train out of Section.*—Trains must not be considered out of section, and the "train out of section" signal must not be given to the signal box in the rear until the last vehicle of the train (or the last vehicle of the "slip" portion of the train), with tail lamp, attached has passed the signal box, and is within the home signal, or has been shunted clear of the main line.

When the last vehicle of a train does not "pass" the signal box before it has been shunted into a siding, or when a train has been brought to a stand within the home signal, and it is necessary to give the "train out of section" signal before the train passes the signal box, the signalman must, before giving such signal, ascertain from the guard or shunter in charge of the train that the whole of the train, with tail lamp attached, has arrived, and the guard or shunter will be held responsible for giving this information to the signalman; the fireman being similarly responsible in the case of a light engine.

During foggy weather or falling snow, the "train out of section" signal must not, except where special instructions are issued to the contrary, be given until the train has proceeded at least a quarter of a mile beyond the home signal, and is continuing its journey, or has been shunted clear of the main line.

11. *Course to Be Pursued When a Train Is an Unusually Long Time in a Section.*—Should an unusual time elapse after the "train entering section" signal has been received without the train so signaled coming in sight, the signalman must, if there is a tunnel in the section in which the train is running, prevent any train in the opposite direction proceeding on its journey until he has ascertained that the line on which it has to run is clear; and if there is no tunnel in the section, the signalman must stop the first train proceeding in the opposite direction, and inform the driver of the circumstance, and, after the necessary signals have been sent and acknowledged, instruct him to proceed with caution.

12. *Obstruction Danger Signal.*—Should it be necessary, in consequence of obstruction or other cause, for an approaching train to be stopped at the signal box in the rear, the "obstruction danger" signal must be forwarded to that box, and the signalman there must immediately exhibit the "danger" signal and take the necessary measures to stop the approaching train; he must not allow the train to proceed until he has received from the signal box in advance the "obstruction removed" signal nor until the proper block signals have been sent and acknowledged.

Should there be reason to suppose that both lines are fouled, the signalman must send the "obstruction danger" signal in both directions, and where there are parallel running lines the requisite steps must be taken to stop the trains running on any line that may possibly be obstructed.

Should a signalman receiving the "obstruction danger" signal succeed in stopping a train for which the "be ready" signal has been accepted by the signalman at the box in advance, he must once advise the signalman at the box by giving the "canceling" signal.

13. *Blocking Back.*—Where the "blocking back" signal is used, when it is necessary, after the passing of one train and before giving permission for another to leave the signal box in the rear, to obstruct the line inside the home signal, by crossing a train or vehicles from one line to another for shunting purposes, or by allowing a train or vehicles to leave a loop line, or a siding, for the main line, the "blocking back" signal (2—4) must, unless instructions are issued to the contrary, be given to the signal box or boxes in the rear, and, on this being acknowledged by repetition, the block indicator for the line or lines intended to be occupied must be placed or maintained at the "train on line" or other authorized blocked position.

The same course must be pursued before the line is obstructed outside the home signal.

When a signalman asks permission to occupy the line *outside* his home signal, he must give the "blocking back" signal (3—3), to the signalman at the box in the rear, and the latter must, before acknowledging by repetition the "blocking back" signal (3—3) satisfy himself that he can with safety give such permission, and that he has not allowed a train to approach his signal box from the signal box in the rear under rule 3, unless there is a distance of at least half a mile between his home signal applicable to such train and the signal box from which he has received the "blocking back" signal, or, if at a junction, he has set his facing points for another line, and that line is clear according to these regulations.

The block indicator for the line or lines intended to be occupied must be placed or maintained at the "train on line" or other authorized blocked position.

If, when a signalman gives the "blocking back" signal (3—3) for the purpose of asking permission to occupy the line *outside* his home signal, the signalman at the box in the rear is not in a position to give such permission, he must not repeat the "blocking back" signal, or acknowledge it in any way, and until the signal has been acknowledged, the line must not be occupied.

Unless special permission is given, no train or vehicle must be placed outside a home signal where the line is on a falling gradient toward the signal box in the rear.

When the obstruction has been removed and the main line or lines are again clear, the "obstruction removed" signal must be given to the signal box in the rear.

The signalmen forwarding and receiving the "blocking back" signal must make a note of the circumstance in their train register books.

14. *Section Obstructed by Accident or by Disabled Train.*—Should a signalman receive information from the fireman or guard of a disabled train that a second train is required to enter the section to assist the disabled train, or should it be necessary for the breakdown van train to enter a section obstructed by accident or otherwise, the second train or the breakdown van train, as the case may be, may, after having been brought to a stand and the driver informed of the circumstances, be allowed to enter the section under the following arrangements:

The signalman must inform the signalman at the box in advance of the circumstances, and give the "train entering section" signal on the bell to the signal box in advance, and, after it has been acknowledged, he must note the circumstance in his train register book, and then allow the second train to enter the section. The signalman at the box in advance must also note the circumstance in his train register book, and must not give the "train out of section" signal until both trains have arrived. The guard of the train requiring assistance must ride on the engine of the second train, and point out to the driver the position of the disabled train. The second train must run at reduced speed, and great caution must be observed by all concerned. When the "train out of section" signal is received from the signal box in advance, and permission has been obtained for another train to proceed, such other train must be stopped at the signal box in the rear, and the driver instructed to proceed cautiously through the section.

15. *Breakdown Van Trains and Engine Replacing or Assisting Disabled Engine.*—To prevent delays, breakdown van trains when proceeding to clear the line, must be signaled as express passenger trains, the "shunt train for following train to pass," signal being given whenever the sections in advance are occupied by trains which the breakdown gang must pass to reach the scene of accident.

The same course must be adopted in the case of one engine proceeding to take the place of another that has failed, or of an engine, with or without a train, when sent forward to render assistance in case of failure or accident to preceding trains.

16. *When Block Telegraph May Be Suspended for Single Line Working.*—Should any obstruction occur necessitating the working of single line, and it is necessary to suspend block telegraph working, this must be done only by an order in writing from the person in charge who arranges the single line working; but during foggy weather or falling snow, or when a tunnel intervenes, or the gradients are heavy on the section of the line where the traffic has to be worked on a single line, block telegraph working must be maintained, the up trains being signaled on the up line block telegraph circuit and the down trains on the down line block telegraph circuit, or the pilotman must accompany every train passing over the single line. On the working of the double line being resumed, any order suspending the working of the line by block telegraph is to be canceled by a written notice in the same manner and at the same time as the order for working single line is canceled.

17. *Stop and Examine Train.*—If a signalman observe anything unusual in a train during its passage, such as signals of alarm by a passenger, goods falling off, a vehicle on fire, a hot axle box, or other mishap, *except a tail lamp missing or out, or a train divided, for arrangements as to which see Rules* 19 *and* 20, he must give to the signalman at the signal box in advance the "stop and examine train" signal, and must himself exhibit his signals to stop any train coming in the opposite direction; and the signalman at the signal box in advance must acknowledge such signal, and immediately exhibit the danger signals to stop any train coming from or going toward the signal box from which the signal was received. The train, when stopped, must be carefully examined and dealt with as occasion may require; should any train going in the opposite direction have been stopped, it must be allowed to proceed after satisfactory evidence has been obtained that the line on which it is about to run is not obstructed.

Should the signalman who receives the "stop and examine train" signal be unable to ascertain after examination of the train why the signal was sent, he must inform the driver of the first train traveling in the opposite direction of the circumstances, and instruct him to proceed cautiously to the next signal box.

Where practicable, the signalman must also telegraph or telephone the signal box in advance the cause of sending the "stop and examine train" signal. Signalmen must be careful to notice each train as it passes, to ascertain whether there is any apparent necessity for having it stopped at the next signal box for examination.

18. *Canceling Signal.*—Should it be necessary to cancel the "be ready" (or "is line clear?") or the "train entering section" signal, the "canceling" signal must be forwarded, and the signalman receiving the signal must, after acknowledging it, place or maintain the block indicator in its normal position, and an entry must be made in the train register book recording the fact of the signal having been canceled. The "canceling signal must not be used unless the "be ready" (or "is line clear"?) or the "train entering section" signal has been acknowledged or accepted. This signal must only be used in cases where a train has been signaled to the signal box in advance and it is found that such train will not proceed in the usual course.

19. *Train passed without Tail Lamp.*—All trains and light engines will carry a tail lamp in the rear, both by day and by night, to indicate to the signalman that no vehicle has become detached on the journey, and signalmen must carefully watch each train as it passes, and satisfy themselves that it is complete before giving the "train out of section" signal to the signal box in the rear. Should a train pass a signal box and the signalman be unable to satisfy himself whether or not the tail lamp is on the train, he must immediately exhibit the danger signal, and stop the first train going in the opposite direction, informing the driver what has occured, and instructing him to proceed cautiously so as to avoid danger in the event of any portion of the train having fouled the line on which he is running. The signalman must also send the "train passed without tail lamp" signal (*nine consecutive beats*) to the signal box in advance, and must not give the "train out of section" signal to the signal box from which the train without tail lamp has arrived, but must call the attention of the signal man there in the usual manner, and, on gaining attention must give the "train passed without tail lamp" signal (4-5).

In such a case the signalman at the box in the rear may give "be ready" (or "is line clear?") for a following train although he has not received the "train out of section" signal.

The signalman at the box in advance, on receiving the "train passed without tail lamp" signal, must acknowledge it, and place the signals at danger to stop the approaching train, advising the guard and driver of the circumstances. If, where the sections are short, a signalman receiving the "train passed without tail lamp" signal of nine consecutive beats, finds that he cannot stop the train except by bringing it to a sudden stand, he must not place his signals to danger, but, as the train is approaching, send the "train entering section" signal to the signal box in advance and *immediately* follow it with the "train passed without tail lamp" signal

When the signalman who sent the "train passed without tail lamp" signal (4—5) receives "be ready" (or "is line clear?") for the following train (unless in the meantime he has received intimation from the signal box in advance that the train has arrived complete), he must not acknowledge it in the usual way, but must repeat the "train passed without tail lamp" signal (4—5), and place the block indicator to "line clear." The signalman in the rear receiving this signal must stop the train and verbally instruct the driver to proceed cautiously to the next signal box in advance, informing him why it is necessary that he should do so, and then give the "train entering section" signal. As soon as the train, the driver of which has been cautioned, has passed the signal box from which the "train passed without tail lamp" signal was sent, the signalman there must give the "train out of section" signal, and the signaling of the trains must then be resumed in the ordinary manner.

Should, however, the signalman sending the "train passed without tail lamp" signal receive an intimation from the signal box in advance that the train has arrived complete, he must, if he has not in the meantime given permission for a following train to leave the signal box in the rear, call the attention of the signalman at that box and give the "train out of section" signal.

If a train should pass with a tail light out when it should be burning, and the signalman can plainly see the lamp, and is satisfied that the train is complete, he must give the "train out of section" signal to the signal box in the rear, and the "train passed without tail lamp" signal (9 *consecutive beats*) to the signal box in advance, and, where practicable, also telegraph or telephone to the signal box in advance, stating that the lamp is not missing, but out. In such a case it will not be necessary for the signalman sending the signal to stop any train going in the opposite direction, but the signalman in advance must stop the approaching train and inform the guard of the circumstances.

Should a train that is appointed to convey a slip portion pass a signal box short of the proper slip tail signals (unless it be the box immediately preceding the station where the portion has to be slipped, for instructions as to which, see following clause), the signalman must assume that the slip portion has become detached, and send to the signal box ahead the "train divided" signal, and to the signal box in the rear the "train passed without tail lamp" signal; if the signalman in advance finds on the arrival of the train that the slip portion has broken away, he must telegraph or telephone to the signal box ahead, "slip portion broken away, train traveling without it," and this message must be repeated from signal box to signal box, as the train passes, as far as the slip portion would have run, the train itself being signaled and the line cleared in the usual way. Should the slip portion be afterwards sent on by special engine, it must be signaled as a passenger train.

Should a train that is appointed to convey a slip portion be short of the proper slip tail signals when it passes the signal box next in the rear of the station at which the portion is to be slipped, the signalman must not send forward the "train divided" signal, but must only send the "train passed without tail lamp" signal to the signal box in the rear. He must then ask the signalman in advance on the speaking instrument, "has slip portion arrived complete?" If the reply is "yes," he must send the "train out of section" signal to the signal box in the rear; but if the answer is "no," he must *immediately* telegraph or telephone to the signal box in the rear, "slip portion not arrived."

20. *Train Divided.*—This signal must be sent to the signal box in advance in the event of a signalman observing that a train has become divided, and is running in two or more parts If the train is assisted by a bank engine in the rear, or is running on a falling gradient, or between short sections where the stoppage of the first part would risk a collision with the second part, the signalman receiving such signal must *immediately* exhibit the danger signal to stop any train going towards the signal box from which the signal was received, but if the line on which the divided train is running is clear ahead for it to run upon, he must not exhibit the signals to stop the first portion, but must give the driver a green signal, either by flag or hand lamp, as occasion may require, waving the signal slowly from side to side. The driver, on seeing the green signal waved slowly from side to side, will understand that his train is divided, and must exercise great caution by looking out for the second portion, and unless he has reason to believe the line is not clear ahead, must not stop the portion attached to his engine until he is satisfied that the rear portion has been stopped, or is running very slowly. He must, however, observe and obey any signals that may be exhibited against him. So soon as the first portion of the train has passed, the signalman sending and receiving the "train divided" signal must take proper measures for dealing with the second portion, and place detonators on the rails to attract the attention of the guard, or of the bank engine driver, should there be a bank engine in the the rear.

If the divided train is running on a rising gradient, or where the line is level, and is not assisted by a bank engine in the rear, the signalman receiving the signal must exhibit the danger signal to stop any train coming from or going toward the signal box from which the signal was received. The first portion of the divided train, when stopped, must be shunted into a siding as expeditiously as circumstances will permit, or otherwise dealt with as may be necessary to prevent the second portion coming into collision with it.

Should any train going in the opposite direction have been stopped, it must not be allowed to proceed until it has been ascertained that the line on which it is about to run is not obstructed. Should a train become divided in starting, and the driver run forward with the first portion, leaving the rear portion stationary, the "stop and examine train" signal must be sent to the signal box in advance, and not the "train divided" signal.

21. *Shunt train for following train to pass.*—This signal must be used to prevent important trains being delayed by less important trains. When, before the "train out of section" signal has been received from the signal box in advance for the last train, the signalman receives a signal from the box in the rear for a more important train, the "shunt" signal must be sent to the signal box in advance, and the signalman there, on receiving this signal, must take the necessary measures to clear the line so as to prevent delay to the second train. He must use his discretion as to the best means of effecting the object in view, and if he is unable, from any cause, to shunt the train at his signal box, or if he thinks it inexpedient to do so, he must allow the train to proceed, and send foward the "shunt" signal to the signal box in advance. The signalmen forwarding and receiving the "shunt" signal must make a note of it in their train register books.

22. *Vehicles Running Away on Wrong Line.*—Should any vehicle or portion of a train be running back in the wrong direction, or should a train be proceeding on the wrong line, the signalman must immediately exhibit the danger signal, and call the attention of the signalman at the next box towards which the vehicle, train, or portion of the train may be running, by giving the "vehicles running away on wrong line" signal; he must also stop the first train going in the same direction on the right line, and after informing the driver what has occurred, instruct him to proceed cautiously. The signalman in the rear receiving the signal must immediately exhibit the danger signal to stop any train coming from or going towards the signal box from which the signal was received, and take any other measures that may be necessary, such as turning the runaway train or vehicles across to the other line, or into a siding, as may be most expedient under the circumstances. In the event of a runaway train or vehicles being turned across to the other line, the "vehicles running away on right line" signal must be passed on to the next signal box. Should the signalman be unable to take such protective measures, he must pass on the "vehicles running away on wrong line" signal to the next signal box in the rear; he must also place detonators on the rails to attract the attention of the men in charge of the train or portion of the train.

Should any train traveling in the opposite direction be stopped, it must not be allowed to proceed until it has been ascertained that the line on which it is about to run is not obstructed.

The signalman at the box from which the runaway train has started, or any other signalman whose box may be passed by the runaway train, must immediately give the "obstruction danger" signal to the signalman in the rear before giving the "vehicles running away on wrong line" signal, as prompt action on the part of both signalmen may prevent a mishap. Should the signalman receiving the "obstruction danger" signal succeed in stopping the train or engine for which he has given the "be ready" (or "is line clear?") signal, he must at once advise the signalman in advance by giving the "canceling" signal

23. *Vehicles Running Away on Right Line.*—If any train, vehicle, or portion of a train has escaped and is running away in the proper direction on the right line, or has entered the section without authority, the signalman at the box in advance must be advised of the fact by the signalman at the box in the rear giving the "vehicles running away on right line" signal. The signalman forwarding this signal must immediately exhibit the danger signal to stop any train coming from or going towards the signal box towards which the vehicle or train is running, and the signalman receiving the signal must also immediately exhibit the danger signal to stop any train coming from or going towards the signal box from which the signal was received (unless there is a train in block in the same section as the runaway vehicle or train and in front thereof, in which case, if the line be clear, such train may be allowed to pass the signals before they are exhibited to stop the runaway train), and he must arrange for the line on which the vehicle or train is running to be cleared, and, if necessary, send the signal forward, and take such other measures as he may consider most expedient under the circumstances. Should any train traveling in the opposite direction be stopped, it must not be allowed to proceed until satisfactory evidence has been obtained that the line on which it is about to run is not obstructed.

24*. *Opening and Closing of Signal Boxes Where Switches Are Provided.*—At signal boxes open during certain times, switches are provided to enable the block instruments on either side to be "put through" when the box is closed. The signalman on taking duty must open the switch and give notice to the boxes he communicates with by 15 strokes (5—5—5) on the bell, which must be acknowledged by repetition, and he must then place his indicators for the rear section in accord with the indicators for the section in advance. He must be careful not to put the signals to "danger" in face of a train which may be traveling in the section towards him.

If, at the time the switch is opened, the block indicator from the box in advance shows "train on line," the signalman must not give the "line clear" signal until the train has passed his signal box, or "line clear" has been signalled from the box in advance.

When the time for leaving duty arrives the signalman must not switch his apparatus out of circuit until "line clear" has been received from the box in advance for the train for which the "be ready" (or "is line clear?") signal was last accepted by him from the box in rear. When that is the case, the code of 17 strokes (7-5—5) on the bell must be given and acknowledged, and the switch may then be closed.

The time of openings and closing to be entered in the train register book.

The signalman must ascertain, by speaking, telegraph or telephone from the boxes on either side, whether there are trains running in the sections at the time of opening the block telegraph switch.

No box must be switched out when any failure exists in connection with the instruments or bells, nor, in the event of a failure having been rectified, until the last train allowed to enter the section with a "caution" signal has passed through.

When a signal box is kept open beyond the usual time for any cause, or when a box that is only switched in when required is open, the signalman at that box must not accept the "be ready" (or "is line clear?") for any train unless he has got that signal accepted by the box in advance. If the "be ready" (or "is line clear?") has not been accepted by the box in advance, the train must be accepted under the "warning arrangement," if the use of that signal is authorized, and the signalman receiving the "warning" signal must advise the driver that the box in advance, usually switched out, is open. This instruction will not apply in the case of signal boxes which are specially opened during certain periods of the year in accordance with the notices issued by the district superintendents.

25. *Failure of Instruments or Bells.*—In the event of any failure of the instruments or bells, so that the necessary signals cannot be forwarded and received, no train must be al-

* Rule 24 is not uniform on the different railroads.

lowed to pass a signal box into that section of the line where the failure exists, without having been previously brought TO A STAND and the driver and guard or guards advised of the circumstance. The driver must then be instructed to proceed cautiously, in order to stop short of any obstruction there may be on the line. Where there are no speaking instruments, or when the speaking instruments have failed, the driver of the first train thus warned must be instructed to stop at the signal box in advance, and inform the signalman there that the bells or instruments have failed at the signal box in the rear.

No train must be allowed to follow another train within *five* minutes, unless the signalman sees that the section ahead is clear, and when a tunnel intervenes in a block section, not within *ten* minutes, unless the signalman can satisfy himself that the tunnel is clear; in both cases the driver must be stopped and cautioned as above directed. Steps must be immediately taken to have the telegraphic apparatus put into working order, and when the failure has been remedied, and the instruments are again in working order, the driver of the last train allowed to proceed through the section cautiously must be supplied with a written notice to that effect, and instructed to stop at the next signal box then open, and hand the notice to the signalman. The signalman receiving this notice must give the "train out of section" signal to the signal box in the rear, and the signaling must then be recommenced in accordance with these regulations.

26. *Recording Time when Signals are Forwarded and Received.*—Except where special instructions to the contrary are issued, the time at which all signals are forwarded and received must be made legibly with a pen in the train register book, and the signalman on duty must place his name immediately under the last entry made by him at the expiration of his hours of duty.

If an incorrect entry be made, a line must be drawn lightly through it, and the correction made above or below it, so that the original entry may be clearly seen.

In recording the time signals are received and forwarded, fractional parts of a minute less than half a minute must not be counted, and the half minute and fractional parts more than half a minute must be reckoned as a minute, thus: 15¼ minutes must be entered as 15 minutes only, and 15½ minutes as 16 minutes.

27. *Testing Block Indicators and Bells.*—This signal must be used to ascertain whether the bells and instruments are in perfect order, and only when no train has been signaled. Where the bell instrument is separate, the bell testing signal must precede the block instrument testing signal.

28. *Time Signal.*—Signalmen receiving this signal on the speaking instruments at 10 a. m. (*see Rule 24 in the Book of Rules and Regulations*) must communicate the information to the signal boxes which do not receive it on the speaking instruments, by giving the "time" signal on the bell. Signalmen must regulate their clocks accordingly.

29. *Lampman or Fog Signalman Required.*—At boxes where a lampman or fog-signalman cannot be communicated with by the signalman on duty, the signal "lampman or fog-signalman required" must be given to the box where the man required can be communicated with. The signalman receiving such signal must at once inform the station master or person in charge in order that the necessary assistance may be given.

30. *Testing Controlled or Slotted Signals.*—Signals which are slotted from another block signal box must be tested as soon after the signalmen change duty as the running of the trains will permit. The signalman in charge of the controlled or slotted signal, after releasing the lever so far as he is concerned, must give 20 strokes on the bell (thus: 5—5—5—5) to the signalman at the block signal box from which the signal is slotted. This must be repeated and the signal lever worked three times slowly. Each signalman must make an entry in his train register book of the transaction, and if the wire working the slot requires adjusting, the signalman going off duty must walk to the other block signal box and see it put right, unless he can get this done by sending a message on the speaking instrument or otherwise. Controlled or slotted signals must not be tested after the "be ready" (or "is line clear?") has been received for a train on the line to which they refer.

31. *Parallel Lines.*—With reference to Rules 12, 17, 19, 20, 22, and 23, where there are parallel running lines, the necessary steps must be taken to stop or caution the trains running on any lines that may possibly be obstructed by what has occurred.

32. *Mixed Trains* conveying passengers and goods must be signaled and dealt with as passenger trains.

33. *Public Level Crossings.*—Traction or other heavy engines, or heavy loads of timber, etc., must not be allowed to pass over level crossings at block signal boxes after permission has been given for a train to approach from the signal box in the rear, nor, where the "blocking back" signal is used, until the line has first been blocked by telegraph in both directions in accordance with the regulations. The "be ready" (or "is line clear?") signal must not be accepted after permission has been given for a traction or other heavy engine, or a heavy load of timber, etc., to cross until it is clear of the line.

TECHNICAL.

Manufacturing and Business.

Mr. P. J. Ryan, recently with the Penn Steel Castings Co., has entered the service of the Benjamin, Atha & Illingworth Co., of Newark, N. J. He represents the company's steel castings department in New York and vicinity.

The Hollow Universal Brake Beam Co., of East St. Louis has been organized, with a capital stock of $500,000, to manufacture railway appliances. James F. Aglar, Fred W. Sutton, Sanford Northrup are the incorporators.

The Standard Electric Co., of Chicago, has recently received an order from the Cincinnati-Edison Co., for four additional 80-light standard arc dynamos and standard lights. This company some months ago installed in its plant 32 50-light standard arc machines which have been running under severe conditions and have proved very economical.

The Weir Frog Company reports large orders for the new automatic spring switch stand illustrated in these columns Oct. 12, 1894. It will be remembered that this stand has no clutch limiting throw, and consequently the switch points are always kept close to main or stock rails.

Iron and Steel.

The Illinois Steel Co. will erect a large construction mill in Joliet. The mill, it is stated, will cost $1,000,000 and will employ over 1,000 men.

The Sheffield Coal, Iron & Steel Co. has been organized at Sheffield, Ala., and has acquired blast furnaces with a capacity of 450 tons a day, 70,000 acres of mineral lands, 300 coke ovens at Jasper, Ala., and the Gumble and Carbon Valley coal mines. John Fritz, of Bethlehem, Pa., is President of the corporation.

The Finished Steel Company has been organized at Youngstown, O., with a capital of $100,000, electing C. Seymour Dutton, President and General Manager; H. M. Garlick, Vice-President; T. E. Davey Secretary and Treasurer. The company will build at once at Youngstown, O.

The production of the Carnegie Steel Works, at Homestead, passed all previous records during May by 10,000 tons. Over 40,000 tons were shipped. The company expects to secure a large armor plate contract from Russia. Two double forged sample plates were forwarded to that country about a month ago. The Japanese Government is reported to have about closed a contract with the company for a large amount of plate.

The successful re-organization of the Pennsylvania and Maryland Steel Companies is now substantially guaranteed. The first installment of $20 per share on the new issue of $1,500,000 preferred stock of the re-organized and combined companies, to be used in liquidating the debts in excess of the funded obligations and to give the companies new working capital, was due on June 15, but 50 per cent., or $750,000, of the whole million and a half dollars of the subscriptions were paid up in full. The business of the Pennsylvania Steel Company is again quite prosperous, and its mills are working day and night. Orders for steel and iron products already booked will keep the works busy for months to come, while the outlook for future business at profitable prices is very encouraging.

Tennessee Coal, Iron & Railroad Co. and the Sloss Iron & Steel Co. have announced an advance of 50 cents a ton in the price of Southern pig iron. This makes the total advance since April 1, $1.75 a ton. The Sloss Company has sold its output for the next 90 days, and the Tennessee Coal & Iron Co. is sold ahead for four months.

The contract for the entire iron work for the Siegel, Cooper & Co.'s new building at Sixth avenue, extending from Eighteenth to Nineteenth streets, New York, and occupying about one-half the entire block, has been awarded to Milliken Bros., No. 39 Cortlandt street, New York City. Messrs, De Lemos & Cordes are the architects. The building is to be 460 ft. long by 184 ft. wide, six stories and basement, and a tower in the front central portion, extending up 11 stories. The building will be entirely fireproof and of skeleton construction. The columns are of cast iron, and are arranged to receive two additional stories at some future date. About 8,000 tons of iron will be required in the construction of this work. The iron contract is one of the largest ever let in New York for a single structure.

Interlocking.

The National Switch & Signal Co., has taken a contract for interlocking switches and signals for the National Docks Railway which will require 195 levers. This is the largest contract given out for some time. It will require six towers. The National Docks Railway is a terminal line at Communipaw, N. J.

The National Switch & Signal Co. also has a contract for putting up a 32-lever machine on the Brooklyn Elevated road.

The Air Brake Suits.

The Westinghouse-Boyden appeal cases were heard before the United States Circuit Court of Appeals, Judges Goff, Simonton and Hughes, at Richmond, Va., on the 10th and 11th insts. The appeal of the Boyden Co. was from the decision of Judge Morris, of the United States Circuit Court at Baltimore, March 11, that claim 2 of patent 360,070 had been infringed, and the cross-appeal of the Westinghouse Co. that claims 1 and 4 of said patent were not infringed. The cases were heard together. Messrs. Christy & Betts appeared for the Westinghouse, and Messrs. Hill & Fenton for the Boyden Co. The decision will be announced Monday, Oct. 1, 1895.

The Cumberland Shops of the Baltimore & Ohio.

We fear that we were misled last week into printing some news that is not quite accurate concerning the plans of the Baltimore & Ohio for shops at Cumberland. The General Superintendent of Motive Power writes: "No shops have been built at Cumberland. The only work to be done there is the removal of a roundhouse from Keyser to Cumberland, which will have a small square shop attached to it." The account which we printed last week was received from a correspondent who had ample means of verifying the statement and who has hitherto been found accurate. Moreover, information given out to reporters from the B. & O. general offices was all in line with what we published.

Ajax Bearings.

The new vessels of the American line, the St. Louis and the St. Paul, are both equipped with bearings made by the Ajax Metal Company, of Philadelphia. This is the same metal that was used in the bearings of the famous New York Central engine No. 999. About 40,000 pounds will be used in the two vessels mentioned. The trial trip of the St. Louis was so satisfactory that not a stop was made during the run, and although the vessel maintained an average speed of 18.37 knots, there was no indication of heating. Of the many trial trips of which her captain has been in charge this was, he has said, the most satisfactory.

Railroad Appliances at the International Congress.

An exhibition of railroad appliances and inventions has been installed at the Imperial Institute, to be continued during the meeting of the International Congress. It is said to be small and incomplete, but to show some good things. There are 90 exhibitors. Among the articles shown are passenger coaches, signaling and interlocking apparatus, West's hydraulic tire setter, fish plates, joints and fastenings, hand cars and tricycles from the Sheffield Car Co., photographs of Rodger's ballast car, chilled wheels from the New York Car Wheel Works, Meneely's roller bearing, sight feed lubricators from the Vacuum Oil Co., a quick-acting brake from the Westinghouse Co., etc.

Grade Crossing Improvements in Philadelphia.

The depression of the tracks of the Reading Railroad on Pennsylvania avenue, undertaken to avoid numerous grade crossings which have hitherto interrupted traffic upon the streets crossing that road, involves the construction of a four-track road averaging about 25 ft. below the street level. From Broad to Twenty-first streets, 3,500 ft., there will be an open cut; from Twenty-first street to Twenty-sixth street a tunnel of 3,000 ft., and beyond this 2,000 ft. of open cut to Parrish street. Street crossings will be made by means of steel plate girder viaducts. The entire length of the improvement is about 10,000 ft. and will cost $6,000,000, divided equally between the city and the railroad. The work will require about two years. An elaborate system of low-level sewers is being constructed for draining the subway Their maximum depth is from 40 to 50 ft., and the two sub-sewers alone, exclusive of branches, are each over one mile long. The tunnels for this work are now practically completed and the brick-work is being laid. The cost of the sewers alone is about $500,000.

At North Penn Junction, where the North Pennsylvania branch of the Philadelphia & Reading crosses the New York Division of the Pennsylvania Railroad at grade, the tracks of the former have been depressed and those of the latter raised. This work is now nearly completed. It embraces four highway bridges over the North Pennsylvania road besides the bridge over it for the Pennsylvania Railroad. The total cost of the improvements will be about $300,000, of which the city pays two-thirds and the Pennsylvania one-third.

The crossing of Broad street and Lehigh avenue over the Norristown branch of the Philadelphia & Reading was completed in 1893. The railroad company has paved the approaches to this crossing during the past year. Many grade crossings have also been abolished along the Philadelphia & Trenton branch of the Philadelphia between Holmesburg and Tacony; in all of these cases the streets and roads have been carried under the railroad. In other parts of the city many new streets have been opened solely to avoid existing grade crossings.

THE SCRAP HEAP.

Notes.

The West Virginia coal companies, whose works were closed seven weeks ago by the strike, resumed work on June 17.

Denver papers report that two members of the Colorado Legislature have been detected in renting their annual passes over the Denver & Rio Grande Railway at $15 a month.

The roundhouse and repair shop of the Atchison, Topeka & Santa Fe, at Wichita, Kan., was burned on the night of June 9, and a dozen locomotives were badly damaged.

Two members of the New Orleans City Council have been imprisoned for attempting to extort a bribe from Superintendent Marshall, of the Louisville & Nashville, for certain track privileges.

It is reported that the Secretary of War has issued an order that the big passenger steamships of the Northern Steamship Co. shall have the right of way over all other boats through the Soo Canal.

The mail car on a train of the International & Great Northern was robbed on the night of June 13 near Tucker, Tex., by a masked man, who compelled the mail clerk to jump off while the train was in motion.

Electric motor cars have been tested twice on the Burlington & Mountain Holly line of the Pennsylvania Railroad. On the second test a speed of 42 miles an hour was attained, with three cars. The motor car has two trolley poles.

John A. Hanst, a paymaster of the Pennsylvania Railroad, has been sentenced at Philadelphia to six years' imprisonment for embezzlement. Hanst had been in the employ of the company 27 years, and during the past six years had taken $10,000. It is said that he also stole $1,000 from the Young Men's Christian Association, of which he was treasurer.

On June 8 four men were killed by suffocation in the Alpine tunnel near Pitkin, Col. The tunnel had been disused for a long time and earth had fallen from the roof in several places. The four men, going to clear the tunnel, were on a locomotive, and they were overcome by the gas from the engine, the accumulation of earth interfering very much with the ventilation. It was several hours before rescuers could enter the tunnel.

General Manager McNamara, of the Albany Railway, running street cars in Albany, N. Y., has notified the Mayor of that city that according to his understanding of the constitution, confirmed by the advice of the company's counsel, the railroad company will be liable to punishment for misdemeanor if it carries policemen and firemen free. The law authorizing mayors to issue passes to these public officers will probably be tested in the courts.

The report that the use of bicycles has become so common as to seriously diminish the income of street railroads now comes from San Francisco and Oakland as well as from Denver and other places. The president of a street railroad in Oakland says that only one street line in that city is earning more than its expenses. In San Francisco there are many hills and some bad pavements

which would naturally discourage the bicycle rider, but in spite of this, one of the principal car lines reports that its receipts are $1,000 a month less than what was considered a normal rate.

The New York, New Haven & Hartford recently issued an order forbidding train baggagemen and others to carry letters on other than railroad business and the reporters have since indulged in a good deal of discussion as to whether the law requires such a strict exclusion of news letters. The first reports indicated that the order forbade the acceptance of letters on any terms, but later the order seems to have been modified, so that letters inclosed in stamped envelopes of the right denomination may be carried. This is in conformity to what we have always understood to be the law. It is said that many newspaper correspondents make use of the baggage car for the transmission of reports to their papers, and that the present order was occasioned by attempts of lottery managers to employ this means of transportation for the purpose of evading the law excluding lottery matter from the mails.

Louisville Bridge Tolls.

At Louisville, Ky., June 12, the Chancery Court ordered the Louisville Bridge Company to make a reduction of 25 per cent. in its bridge tolls. The bridge is used by the Louisville & Nashville, the Louisville, New Albany & Chicago, the Pennsylvania and the Louisville, Evansville & St. Louis Railroads, all of which were made parties to the suit, together with the Ohio & Mississippi, which used the bridge at the time of the original contract. The proceedings were brought by the Louisville & Nashville two years ago, the contract providing that tolls were to be reduced when the traffic exceeded a certain sum. The decision carries with it an order for the return of excess tolls, amounting, in the case of each road, to about $200,000.

Locomotive Exhibit at the Atlanta Exhibition.

The Cotton States & International Exposition will build an annex of 35,000 sq. ft. to the Transportation Building, in order to accommodate the exhibits of locomotives and trains. A number of the southern railroads will have large exhibits, and the Richmond Locomotive Works will have a fine display specially prepared for the occasion.

A New York and Brooklyn Tunnel.

Governor Morton, of New York, has signed the bill authorizing the New York & Brooklyn Tunnel Company to construct a tunnel between New York and Brooklyn.

Cork Pavement.

In our issue of March 1 last we described a form of cork brick for railroad stations, ferryboats and pavements in use in Sydney, Australia, and Edinburgh, Scotland. F. J. Jenner, sole agent for the United States, Havemeyer Building, New York City, recently received an order from the Hoboken Ferry Co. to lay these bricks on its southern slip in Hoboken, which was done last week. Owing to the narrowness of the approach and the amount of traffic of heavy loads which pass back and forth within the limited space, the pavement will receive a very severe test, and the results will be watched with interest by some railroad and ferry officials. On account of the tide, the ferry bridge is always on an incline, and therefore the strain upon the bricks will be much greater than on a plane. It is claimed for these bricks that, even when wet, a horse will always get a firm footing. This being so, the cork bricks may be a success on ferry bridges when no other material would fulfill all requirements. In order to keep them in position on the ferry bridge some claimed that the bricks would have to be nailed down (the elasticity of the composition permits this), but the method of fastening adopted by the company made the driving of a nail superfluous. A coat of gas tar was applied to the planks and the bricks dipped in a hot jointing material and stuck down. Within a short time they adhered firmly to the wood. There is sufficient elasticity in the pavement to withstand the shock caused by ferryboats in landing, and the bricks will not work loose. Being non-absorbent, cork brick is especially applicable to teams gangways of ferryboats. It is more sanitary than a wooden deck, besides doing away with disagreeable odors, especially in hot weather. This brick is new in this country, but it has been used with much success in Edinburgh for some time.

The Lake George Incline Railroad.

The Incline Railroad up Prospect Mountain at Lake George, New York, was opened for traffic last Saturday. A number of railroad and newspaper men went to Lake George on the occasion of the formal opening of the line on the invitation of the Horicon Improvement Co., which built the road, and Mr. George H. Daniels, General Passenger Agent of the New York Central. The Lake George Incline Railroad is essentially similar to the Incline Railroad up the Catskill Mountains, which was described in the *Railroad Gazette* Aug. 12 and 26, 1892, except that the latter has three rails. The Lake George line is longer than the Catskill Mountain line, being 1⅝ miles in length, with a vertical rise of 1,700 ft. The maximum grade is 39 per cent. and the minimum is 13 per cent. The cars have a carrying capacity of 85 people. They are built at an angle of 14 deg. and 30 min. The cars are fastened to the ends of the cables, which are 1¼ in. in diameter. One car ascends as the other descends, the two passing each other at a turnout at the middle of the road. This turnout is an ingenious arrangement designed by the Chief Engineer of the road, Mr. Thomas E. Brown, Jr., and the Assistant Engineer, Mr. C. F. Parker. Its use has made it unnecessary to have the third rail, as on the Catskill Mountain line. The hoisting engines are double cylinder engines, made by Otis Bros. & Co., of New York. The time in which the line has been constructed is remarkably short. Work was started, clearing away the trees, on Jan. 2, 1895, before the surveys had been completed, and the first car was hauled up the mountain on June 2. All the grading, trestling, rock work, etc., was done by Mairs & Lewis, of 18 Broadway, who were contractors on the Catskill Mountain line.

Responsibility of the Public in Railroad Strikes.

This is the title of an article in the recent "railroad number" of the New York *Independent* by Mr. C. M. Hobbs, Purchasing Agent of the Denver & Rio Grande.

Mr. Hobbs points out in the beginning that two vital elements in every strike are the preservation of the validity of contract and protection to person and property. When railroad troubles arise, if the public will concede to the railroad companies the same enjoyment of these rights that is claimed for every citizen, the labor problem will be greatly simplified; for there is not a strike which assumes any considerable proportions in which one or both of these fundamental rights is not openly and flagrantly violated by striking employees. Most of the strikes of last year were on roads which had contracts with the men, but these contracts were no more regarded by the men than were the gentle breezes which dried the ink with which they were executed.

In conclusion Mr. Hobbs says: "Whatever has been the conservative sentiment, the *effective* sympathy manifested at the beginning of these strikes has almost invariably been with the employees, and has been their strongest weapon and resource in carrying on their fight. Every men who thinks his neighbor has been better treated by the railroad company than himself, allies him on the side of the employees. Narrow, selfish interest on the one hand and unreasonable prejudice on the other, unite together in giving encouragement to the employees and embarrassment to the corporations. Merchants, tradesmen, police officers, county and State officials, politicians and newspapers cater to the men, excuse their acts and fan the flames of passion. As long as only the railroad company suffers, the most flagrant acts of injustice and of violence will be winked at, or apologized for, and it is not until the public peace is brought in peril that the sober sense of the people asserts itself. . . .

Had the people been as well disposed at the beginning as at the end of the trouble to recognize and acknowledge the true character of the issues at stake, the country would have been spared the loss and humiliation and shame which these strikes brought upon it. If, then, it is true that public opinion is such a powerful factor as is claimed in the settlement of railroad strikes and securing the continuous operation of railway lines, the public has a duty and a responsibility of its own in the matter, which it cannot evade. If this duty and responsibility are rightly discharged, the public conscience must be quickened and the people be aroused to give an honest and intelligent judgment upon the merits of these great industrial controversies In the contest which labor is making for an equitable division of the profits of industry, the sympathy of the people is justly with the workingman; but this sympathy should be withheld when he becomes drunken with power. Capital may be selfish, arbitrary and tyrannous, but the public is not the gainer when the tyrant in purple and fine linen is displaced by the one in denim overalls.

The Pennsylvania Clock.

The new clock at the Broad street station of the Pennsylvania Railroad in Philadelphia, which has recently been put in position, at the southeast corner of the building, is a beautiful work of art. Every part of the clock, except the movements and the hands, is of terra cotta. A head and wand of Mercury support the dial, with the assistance of a winged feminine figure at either side. These figures typify, respectively, Transportation and Commerce and Prosperity and Plenty, ideas which are appropriate on the escutcheon of a railroad. Sitting upon the top of the clock is a cupid, who holds at arm's length a metal lamp, which emits light only upon the face of the dial.

Interloc-utions—No. 3.

"What was all that hullubaloo around here last night?" asked the crank of the semaphore one morning. "The repairman," he continued, "put the cover on my box the last time he oiled me, for a wonder, and I couldn't see a thing."

"Oh, nothing much; only that new dandy operator up at the tower," replied the semaphore, in his most sarcastic tone.

"Is that so? What did he do?"

"Just disconnected the detector bar from No. 9 switch, threw the switch under the engine that runs the "jerkwater" and made it do the split, and finally broke the hind leg of Paddy Rogers, the engineman. Maybe the superintendent didn't raise a dust when he got here. While they were cleaning up the mess along comes Matty Rogers, Paddy's woman, with a shawl over her head and their last kid in her arms, and asks the old man would they please give Paddy half time while he's being cured. The old man said he s'posed they'd have to, but he'd a damned sight rather pay the funeral expenses of that chuckle headed operator out of his own pocket. After he got through with Matty he sent for the operator, and to make him feel at home called him every name he could think of, and you know the old man carries a pretty good line; then he asked him why he did it. The operator didn't say much for a while, but after a bit struck a surprising gait, said he'd been on duty for 36 hours steady, that every time he pulled that lever it felt as though his lights were coming up, so he took the bar off to see if it would not ease it up a little; that he only got $30 a month and didn't know as he cared very much for the job after all. Then the old man gave him the grand bounce and a final blessing. After the operator had gone the old man said something about 'economies in operation' that I couldn't understand. But I'm glad the white-livered idiot has been fired," concluded the semaphore, "for because I'm old and work easy he used to yank me up and down in a way that made my bolts rattle."

"Thank Heaven that my jaws are rusty," yawned the crank, for he sometimes found the conversation of the semaphore a little tiring.

International Railroad Congress.

Mr. George Heywood, a director of the Fitchburg Railroad, was chosen a third delegate to represent that company at the International Railroad Congress at a meeting of the directors of the Fitchburg Railroad Co., in Boston on June 11. The other representatives of the company at the International Congress are Mr. H. S. Marcy, President, and Mr. W. L. Chase, a director. The other representatives of the American railroads were published in the *Railroad Gazette* of May 24, page 326.

Title to Pennsylvania Property in Cincinnati.

The Supeme Court of Ohio has rendered a decision which holds that the state is the owner of the ground in Cincinnati upon which the terminal facilities of the Pennsylvania Company are located. The ground with the buildings thereon is worth not less than $5,000,000. It was originally canal property, but ceded many years ago to the city for a street. The city subsequently gave the property to the railroad company. This, it is decided, it had no right to do. The company will carry the case to the United States Supreme Court. Attorney-General Richards is reported as saying that the chief importance of the decision lies in the finding of the court that the mere use of land by the state for canal purposes gives the state absolute ownership, and that the statute of limitation does not operate.

Brace Up for the Summer.

A Massachusetts paper states that employees of the Boston & Maine are just now exercised by a circular, recently distributed to them, which says:

"Your attention is called to the fact that you are not allowed to use tobacco in any form whatever while on duty, nor on trains or in stations when off duty with uniform or badge on. This rule is imperative and must be regarded at all times."

The Canadian Soo Canal.

The new Canadian Canal at Sault Ste. Marie was opened on June 13 last without formal ceremonies. The contracts for the canal and the lift locks were let in November, 1888. The water was first admitted to the locks on Sept. 25, 1894. The canal runs through St. Mary's Island, on the north side of the rapids of St. Mary's River, and, with the river, provides Canada with independent communication between Lakes Huron and Superior. The length of the canal and its approaches is 18,100 ft. The cost has been $4,000,000. The total length of the canal across St. Mary's Island is 4,000 ft., or from eastern to western extremities of the piers 6,000 ft. With its approaches the total distance is 3½ miles. The lock chamber is 900 ft. in length; in width 60 ft., and has a depth of water sufficient to pass vessels of 20 ft. draught. The lock fills in 9 minutes and can be emptied in 7½ minutes. The canal proper has a surface width at low water level of 152 ft. and a bottom width of 145 ft.

CAR BUILDING.

The Chicago, Rock Island & Pacific has given out an order this week to the Michigan Peninsular Car Co., for building 200 cars.

BRIDGE BUILDING.

Hempstead, Tex.—The County Commissioners' Court of Waller County, Tex., will receive bids until July 4, 1895, for building a bridge over the Brazos River, on the Hempstead & Bellville road, about 4 miles from the City of Hempstead. Plans are on file in the office of the County Clerk of Waller County.

New York City.—Mayor Strong, of New York City, has appointed the three commissioners of the new East River bridge, the construction of which is to be undertaken as a joint municipal enterprise by the cities of New York and Brooklyn. The bridge will be built across the East River from Grand street, New York City, to Broadway, Brooklyn. The new commissioners are Francis B. Thurber, Richard Deeves and Samuel Wales.

Sioux City, Ia.—On June 12 work was resumed on the Pacific Short Line Bridge across the Missouri River at Sioux City, Ia. The construction of this bridge was commenced in September, 1890, suspended in December following, resumed in May, 1891, and stopped the second time in August of the same year. In the latter part of December, 1892, the work was again taken up and pushed forward with much vigor until April, 1893, when the failure of the Union Loan & Trust Co. of Sioux City caused the third shut down. To protect their interests the holders of securities in the Union Loan & Trust Co. formed the Credits Commutation Co., an organization of bankers representing creditors in 21 different states. Together with other properties, that of the Pacific Short Line Bridge Co. fell into the hands of that company. In July, 1894, the city of Sioux City voted a 2 per cent. tax (amounting to about $320,000) to aid in the completion of the bridge the tax being made payable on condition that the bridge be completed ready for use by March 2, 1896. On June 8, 1895, the Credit Commutation Co. held a stockholders' meeting and voted to finish the bridge under a new organization—The Combination Bridge Co. The officers of this company are: President, Capt. John Ellis, Kewanee, Ill.; Vice-President, Joseph C. Head, Latrobe, Pa.; Treasurer, T. A. Stoddart, St. Louis, Mo.; Secretary, F. L. Eaton, Sioux City, Ia.

The bridge will consist of two 470 ft. draw spans and two 500 ft. fixed spans 25 ft. center to center of trusses, and will rest on masonry piers. The approaches at each end will consist of earth embankments and short timber trestles. The structure will carry a single track railroad, two foot walks and two roadways. The latter will be supported on cantilever brackets outside the trusses and will be separated from the railroad track by screens. The footwalks will be inside the trusses.

Up to the present time over $400,000 have been expended on the bridge, and the status of work is about as follows: One-half of the metal for the superstructure is rolled, one pivot pier and one draw pier on the Iowa side are sunk to bedrock, and two channel piers are sunk, one to a depth of 45 ft. and the other to a depth of 60 ft. The metal is on hand and partially riveted up for the caissons of the other channel pier and the other pivot pier on the Nebraska side. From this time forward work will be pushed with all possible speed, as the bridge must—in order to earn the aid tax—be completed ready for traffic by March 1, 1896.

J. A. L. Waddell, M. Am. Soc. C. E., is Chief Engineer, and his principal assistant, Lee Treadwell, Assoc. M. Am. Soc. C. E., is in charge of construction.

The Phœnix Bridge Co., of Phœnixville, Pa., and Sooysmith & Co., of New York City, are contractors for the superstructure and substructure respectively.

Wenatchee, Wash.—The Wisconsin Bridge & Iron Co. has a contract to put in a 700 ft. approach to the bridge over the Big Columbia River, on the Great Northern road, at Wenatchee, Wash.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago Junction Railway & Union Stockyards Co., quarterly, 1½ per cent. upon the preferred stock and a semi-annual 4 per cent. on its common stock, payable July 1.

Des Moines & Fort Dodge, 4 per cent. on the preferred stock, payable August 1.

Fitchburg, semi-annual, $2 per share, payable July 15.

Maine Central, quarterly, $1.50 per share.

Manhattan, quarterly, 1½ per cent. on the capital stock, payable July 1.

Minneapolis & St. Louis, 3½ per cent. on its first preferred stock, being at the rate of 5 per cent. per annum, payable July 15.

Northern Central, semi-annual, 3 per cent. on the capital stock, payable July 15.

Quincy Railroad Bridge Co., semi-annual, $5 per share, payable July 1.

Rutland, semi-annual, 2 per cent. on the preferred stock, payable July 1.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Mineral Range, annual, Hancock, Mich.. July 9.

Hancock & Calumet, annual, Hancock, Mich., July 9.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Mechanical Engineers* will hold its annual meeting at Detroit, Mich., June 25, 26, 27, 28.

The *International Railway Congress* will meet at the

Imperial Institute, London, England, beginning June 26.

The *American Society of Civil Engineers* will hold its annual convention at Nantasket Beach, commencing June 18.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

The *Association of Civil Engineers of Cornell University* meets on Friday of each week at 2:30 p. m., from October to May, inclusive, at its association rooms in Lincoln Hall, Ithaca, N. Y.

Engineer's Club of Philadelphia.

At a meeting of the Club on June 15 Wm. D. Beatty read a paper on "The Philadelphia & Reading Coal Storage Plants," which was illustrated with lantern slides and charts, and the paper was discussed by C. W. Hunt, President of the C. W. Hunt Company, of New York; James M. Dodge, President, and Charles Piez, Chief Engineer of the Dodge Coal Storage Company, Nicetown, Philadelphia.

The Civil Engineers' Club of Cleveland.

A regular meeting of the Civil Engineers' Club was held June 11th, 32 members and visitors present. The paper of the evening was by Mr. Frank Aborn, entitled, "Some Facts Concerning Drawing for Engineers." It was a very interesting paper. The practical importance of this increasing and valuable means of communicating ideas and the simple method of acquiring skill by free hand practice were illustrated in a clear, practical manner.

Engineers' Club of Cincinnati.

At the April meeting Mr. G. Bouscaren read a paper on "A Pure Water Supply for Cincinnati," in which he favored the adoption of sand filtration for purifying the Ohio River water for that purpose.

At the May meeting Mr. W. M. Venable read a paper on "Long Distance Transmission of Energy by Electricity." Both of the papers mentioned were printed. Three new members were elected. A permanent standing committee on Ship Canal from the Ohio River to the Lakes was announced and delegates to represent the Club in the Central Board of Business Organizations were appointed.

Local Freight Agents' Association.

The national convention of Local Freight Agents' Local Associations was held in New York June 11, 12 and 13. This convention is composed of representatives of local associations in the principal cities of the country, and each association sends at least one delegate, who is expected to read a paper. The attendance was about 300 there being from three to ten freight agents from each of the pricipal cities.

Papers were read on a number of interesting topics connected with the management of large freight stations, and considerable information was brought out in the discussions which followed. We expect to report these discussions in a future issue.

The following officers were elected for the ensuing year: President, Lot Brown (C., B. & Q.), Chicago; Vice-President, J. A. Lindsay (L. & N.), St. Louis; Secretary, J. V. Braden (P., C., C. & St. L.), Wheeling; Treasurer, C. H. Newton (Wabash), Ft. Wayne, Ind. The next meeting is to be held at Chicago June 9, 1893.

During their four days' stay in New York the members of the association spent a large part of their time in sight-seeing. Wednesday morning was taken up with a visit to Coney Island, and on Thursday the principal freight terminals of New York Harbor were visited, the New York local agents taking the visitors around on a steamer. Friday was devoted to the inspection of ocean steamships in the harbor and a trip to Asbury Park as the guests of the Pennsylvania Railroad.

PERSONAL.

—Mr. T. F. Jordan, Superintendent of Bridge Construction on the Baltimore & Ohio Railroad, died of consumption at his home in Hicksville, O., last week.

—Mr. W. P. Kimble has been appointed Division Engineer of the third and fourth divisions of the New York, Pennsylvania & Ohio, with headquarters at Galion, O., vice Mr. J. W. Morris, transferred.

—Mr. G. S. Taylor has been appointed Receiver of the New Orleans & Southern Railroad in the suit brought by Joseph Price, the President of the company, whose headquarters are in London. Mr. Taylor is at present Secretary and General Manager of the railroad.

—Mr. F. M. Baker, of Owego, N. Y., has been appointed by Governor Morton one of the New York State Commissioners to the Cotton States and International Exhibition which is to be held at Atlanta, Ga., next fall. Mr. Baker is General Superintendent of the Addison & Pennsylvania Railroad.

—Mr. Patrick Buchan, one of the Directors of the Baltimore & Ohio Southwestern, also one of the members of the Ohio & Mississippi Consolidation Committee, died in London last week. He was prominent in the arrangements leading to the consolidation of the Baltimore & Ohio Southwestern and the Ohio & Mississippi

—Mr. C. H. Morehouse, who has been acting as passenger agent of the Atchison, Topeka & Santa Fe, at El Paso, Tex., has been appointed general agent at Denver. Mr. Morehouse will fill the vacancy caused by the resignation of Mr. A. P. Tanner, who has been appointed to the position of General Freight Agent of the Colorado Midland by Receiver G. W. Ristine.

—Mr. James Menzies has recently been appointed Assistant General Freight Agent of the railroads operated by the Plant System, with headquarters at Jacksonville, Fla. The appointment follows the promotion of Mr. F. B. Bapy, formerly Division Freight Agent, to be General Freight Agent of the Plant System.

—Mr. Edward P. Murray, who died at Chicago on June 7, was formerly a well-known railroad man and at one time Division Superintendent of the Canada Southern. He was afterward General Superintendent of the Toledo, St. Louis & Kansas City Railroad, with headquarters at Toledo, and was later engaged in contracting work, and was one of the builders of the Wisconsin Central Railroad. Recently he had been engaged in various enterprises in Chicago.

—Mr. C. A. Hammond, the well-known Secretary of the American Society of Railroad Superintendents, has been appointed General Manager of the Standard Railroad Equipment Co., whose office is in the Central Building, 143 Liberty street, New York City. Mr. Hammond's long experience as a railroad superintendent and civil engineer make him peculiarly well qualified for a place of this kind. He will give special attention to the maintenance of way supplies handled by the Standard Co., prominent among which is the C. A. C. tie plate.

—Mr. John M. Rose, Secretary of the Cape Fear & Yadkin Valley Railroad, died at his home in Fayetteville, N. C., last week. Mr. Rose was 79 years of age and had been connected with the Cape Fear & Yadkin Valley Railroad in some capacity ever since the first rail was laid, having been its Secretary and Treasurer for the last 40 consecutive years. He was in the early days of railroading in North Carolina, Secretary of the old Western Railroad, extending from Fayetteville to the coalfields of Chatham County, and prior to that time was the manager of the old plank road system in central North Carolina. He was a man of ability and was highly esteemed by his neighbors and the people of his state generally.

—Mr. Carlton W. Paris has been appointed Assistant General Passenger Agent of the Baltimore & Ohio Southwestern, and will assume the duties of the position on July 1, with headquarters at Cincinnati. Mr. George B. Warfel, at present Assistant General Passenger Agent at Cincinnati, will be transferred to St. Louis. Mr. Paris was formerly connected with the Ohio & Mississippi Railroad for nearly 28 years, most of that time as Central Passenger Agent at Cincinnati. He resigned soon after the consolidation with the Baltimore & Ohio Southwestern, and after that for a time was with the passenger department of the Cleveland, Cincinnati, Chicago & St. Louis. He has not, however, been in railroad service for the last year.

—Several changes in the Transportation Department of the Pennsylvania Railroad were announced last week. Mr. E. F. Brooks, Superintendent of the Maryland division of the Philadelphia, Wilmington & Baltimore, has been appointed to the Superintendency of the New York division, to succeed Mr. Joseph Crawford, who, on account of illness, has been granted an indefinite leave of absence. Mr. William N. Bannard, Superintendent of the Altoona division, succeeds Mr. Brooks as Superintendent of the Maryland division and Mr. Robert E. Marshall, Superintendent of Motive Power on the Philadelphia, Wilmington & Baltimore road, has been made Superintendent of the Altoona division. Mr. Clarence Mendenhall, Assistant Road Foreman of Engines on the New York division, succeeds to the former office of Mr. Marshall.

—Mr. A. L. Hopkins was last week elected President of the New York, Susquehannah & Western, succeeding Mr. Simon Borg, who remains as a director of the company and will hereafter act as chairman of the board. Mr. Hopkins is at present Receiver of the Chicago & Northern Pacific Railroad, having been appointed to that office some weeks ago on the resignation of the former three receivers of the property. Mr. Hopkins is well known in railroad circles throughout the country through his long connection with Southwestern railroads, particularly the Wabash, the Texas & Pacific and the Missouri Pacific. He was Vice-President and General Manager of the Wabash up to 1879, and when that line became the Wabash, St. Louis & Pacific, he remained with the company until 1889 as Vice-President. During this period he became Second Vice-President of the Missouri Pacific and the other railroads forming the Gould properties in the Southwest, and he has continued as director of the Missouri Pacific up to the present time.

—Mr. E. G. Russell, at present Superintendent of the Rome, Watertown & Ogdensburg Railroad, has been offered the position of General Manager of the Brooklyn Heights Railroad, which operates many miles of electric street railroad in Brooklyn, N. Y. It is said that his salary will be $12,000 a year. A firm of bankers in New York, of which Ex-Governor R. P. Flower is the head, has undertaken to reorganize this property and its plans for the improvements require the practical rebuilding of most of the company's tracks, and it is desired to have a railroad officer of experience in charge of this work. Mr. Russell has been Superintendent of the Rome, Watertown & Ogdensburg since February, 1893, being appointed to that position soon after the New York Central & Hudson River Railroad assumed the operation of the line. He was formerly for many years with the Illinois Central Railroad, and while with that company had charge of many important extensions and improvements. He went to the Illinois Central in 1888 from the Chicago, St. Paul & Kansas City where he was Assistant General Superintendent. On the Illinois Central he was Superintendent of several of the divisions of that company and for a time Superintendent of Transportation. His last position was as Superintendent of the Western Lines with headquarters at Dubuque, Ia., one of the most important superintendencies of the company.

ELECTIONS AND APPOINTMENTS.

Chicago, Burlington & Quincy.—The Burlington Route has established headquarters in Atlanta, Ga. J. N. Merrill, formerly stationed at Nashville, will be in charge as General Southern Agent. A. E. Martin is also transferred from Nashville to Atlanta, and will be Traveling Freight Agent. H. C. Piper, recently at Chattanooga, will be Traveling Passenger Agent.

Mineola & Pittsburg.—A meeting of the Directors of this company, recently organized to build a short railroad in Texas, was held in Mineola, Tex., June 10. B. F. Read, of Mineola, was elected President, and W. C. Hargrave, of Pittsburg, Tex., Vice-President.

Oregon Improvement Co.—Elijah Smith, of New York, was elected President of the Oregon Improvement Co., at Portland, Or., June 18, by a majority of 5,380 votes over W. H. Starbuck, the present President. The new Board of Directors elected is composed of Henry Failing, C. P. Lewis, C. A. Dolph, William M. Ladd and J. Bourne, Jr., of Portland, and Edwin S. Hooley, W. J. Hoffman, James B. O'Neill, Charles McQuade and Charles Schultz, of New York. The Board meets in two weeks to elect other officers of the company.

Santa Fe, Prescott & Phœnix.—W. A. Drake has been appointed Chief Engineer of this company, with headquarters at Prescott, Ariz. Mr. Drake will have charge of the Engineering Department, as also the Department of Track, Bridges and Building, and Water Service, reporting to the President and General Manager.

Weatherford, Mineral Wells & Northwestern.—At the annual meeting of the Weatherford, Mineral Wells & Northwestern Railway, held at Weatherford, Tex., June 11, L. H. Fouts was re-elected President, and E. R. Standish Secretary and Treasurer.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Atlantic & Superior.—Robinson, Fleming & Co., London, have invited applications for £500,000 first mortgage 4-per cent. 20-year bonds of this company, being a part of the authorized issue of £4,000,000. The issue price is 99. It is stated that the Government of Canada has guaranteed the interest on the bonds. The Government authorities correct this by stating that the Government has merely agreed to accept the deposit of certain funds from the company and to pay 3 per cent. on such deposited sums.

Belton & Northwestern.—The projectors of this Texas company, just organized, have engaged Mr. M. W. Wombaugh, of Galveston, to make the surveys from Belton, Tex., for a connection with the St. Louis Southwestern at McGregor. G. C. Pendleton, of Belton, is President.

Choctaw, Oklahoma & Gulf.—The Supreme Court of Oklahoma has handed down a decision dismissing the appeal of the United States Government for an injunction against the railroad. The construction of the road from South McAlester to Oklahoma will therefore now be pushed to completion at once. The injunction was simply to prevent the company from changing the line of its original survey, and the decision in its favor, the officers say, will effect a large saving for construction and also subsequent operating expenses. The division under construction is 112 miles long, and about 20 miles is now completed and in operation.

Depew & Southwestern.—This company was incorporated at Albany, N. Y., June 15, to build and operate a steam road from the village of Depew to the village of Blaisdell, in Erie County, a distance of 10 miles. The capital is $500,000, and the directors are Wilson S. Bissell, A. D. Bissell, H. P. Bissell, Martin Carey, William B. Wright, Jr., William G. Meadows, M. L. Luther, F. M. Taylor and James Murphy, of Buffalo.

Depew & Tonawanda.—This company was incorporated last week with the Depew & Southwestern to build a steam road 10 miles long from Depew to Tonawanda, in Erie County. The directors of the road are the same as in the Depew & Southwestern road.

Des Moines & Kansas City.—This company, operating about one hundred miles of railroad in Iowa, south of Des Moines, and said to be the only narrow gage line in the State, is to be made a standard gage road, the present gage being three feet. The line extends from Des Moines south through Osceola to Gainsville, 112 miles, the terminus being a small town in Northern Missouri. It is expected to have the change of gage and the other improvements, which will be undertaken in connection with this work, accomplished during the fall. The ownership of the railroad is in the East and it is stated that an important extension will be undertaken when the gage has been changed. This is said to be in connection with the project of the Kansas City & Northern

Railroad recently organized at Kansas City, and said to be in the interest of the Missouri, Kansas & Texas. The idea is to build a line connecting Gainsville, the terminus of the Des Moines & Kansas City Railroad, with Kansas City, to form a new line between Kansas City and Des Moines.

Dominion Coal Co.—The 40-mile railroad built by this company on Cape Breton, N. S., has just been completed and will be opened for both freight and passenger traffic on July 1. The railroad extends from Sydney on the north side of the island, where the coal mines of the company are situated, to Louisburg on the south shore, the distance between the two towns being 42 miles. The line is connected with all the important collieries of the company, and has been substantially built, and the track is laid with 80-lb. rails. Piers have been built at both Sydney and Louisburg. The railroad at present has an equipment consisting of 400 coal cars of 16 tons capacity each, and three locomotives. The line has been carrying local traffic for some little time. The opening of the through line will give the Dominion Coal Co. a cheap outlet by water for its coal to New England points, and will enable it to maintain shipments from its mines throughout the year. Heretofore coal could not be shipped during the winter months. Bonds of the Dominion Coal Co., to the extent of $1,500,000 have been issued for this work and sold at a satisfactory price.

Flint & Pere Marquett.—This company each year builds a large mileage of logging branches in Michigan, the usual plan being to have such branches graded and the ties supplied by the owners of the lumber mills or timber tracts which will be benefited by the branch, the railroad company then putting down the rails and operating the line as long as the timber lasts. In 1894 nearly 20 miles of such temporary lumber branches were built, and this year about 4 miles of track has been laid on such temporary branches. One of these lines, two miles long, has been built for J. S. Stearns, near Bennett, in Lake County, and the other two miles near Beaverton, Mich. In addition, about five miles of line has been located ready for grading in Lake County for James Foley, of Ludington.

Kaslo & Slocan.—About 400 men are now reported to be at work on the construction of this railroad, in the southern part of British Columbia. J. Hendry, of Vancouver, B. C., has the contract for the work and he states that 1,000 men will be engaged on the grading before July. Most of the sub-contracts have been let and the work now going on is between Kaslo and Cody Creek. It is expected to complete the entire line by October next. The construction work will be easy. The maximum grades are 3 per cent. The building of this line will give the important mining districts in southern British Columbia an outlet to Spokane, Wash., and the line will have heavy shipments of ore as soon as it is ready for traffic.

New Castle & Meeker.—J. W. Dean, Chief Engineer of the newly projected railroad between New Castle and Meeker, Col., has just arrived in the city, accompanied by a party of New York capitalists over the route. He estimates that it will require $500,000 to build and equip the road, and the prospects are excellent for securing the required funds.

New Orleans & Western.—Engineers are now making surveys and securing right of way for this projected railroad at New Orleans. The route over which the company proposes to build is not known, the projectors declining to make their plans public at the present time. Recently Mr. D. B. Morey, formerly of the traffic department of the Illinois Central at New Orleans, has been made Secretary and Treasurer.

Northwestern Elevated.—At a meeting of the Columbia Construction Co., last week, a resolution was adopted, calling a special meeting of the stockholders July 13 for the purpose of voting on a proposition to increase the capital stock from $2,000,000 to $5,000,000. This company holds the contract for the construction of the Northwestern Elevated Railroad (Chicago), and it is proposed to push that entire work to an early completion. A short time ago the stockholders were given an opportunity to subscribe for $2,000,000 Northwestern Elevated bonds at 90, with a stock bonus of 100 per cent. The total authorized bond issue of the latter company is $15,000,000, but it is stated that no more bonds than are actually required to cover the cost of the construction of the line will be issued.

Port Huron & Lexington.—The grading on the railroad is now completed north of Port Huron, Mich., to a point above Gratiot Beach, and is being hurried forward as fast as possible. The rails have been ordered, and the contractors, Tick Bros., of Detroit, expects to turn the road over to the company by August 1. E. H. Brennan, of Toledo, is President and General Manager.

St. Louis, Avoyelles & Southern.—J. W. Sylvester, Chief Engineer of this road, being built from Bunkie to Port Allen, La., reports that the line was graded a distance of 26 miles from Bunkie to Simsport, and that the first shipment of rails has been made from Joliet, Ill. This part of the line will be constructed by Sept. 1 next.

South Carolina & Georgia.—The company has acquired extensive and valuable terminal facilities at Charleston, S. C. It has obtained from that city the necessary local legislation and from property owners the right of way that will enable it to extend its line to the property mentioned.

Southwestern Air Line.—A party of capitalists were last week inspecting this line of railroad in North Carolina, between Charlotte and its terminus, near Morganton, N. C., with a view to building the road to and beyond Morganton, west.

Terminal Railway of Buffalo.—This company has been incorporated to operate a steam road from a point at or near Blaisdell to the town of Depew, near Buffalo. The capital is $500,000, and the directors are John M. Brinker, Robert W. Jones, H. L. Sprague, Algernon McKay, Charles F. Smith, A. J. Grant, Frank Hammond, William Baker and Charles E. Harmon, of Buffalo.

Toronto, Hamilton & Buffalo.—The contract for the important tunnel on this line in the western portion of Hamilton, Ont., was let last week to Andrew Onderdonk, of Chicago. The work is to be carried on night and day until completed. A conference was held in the Grand Central Station last week between officers of this company and the President of the Michigan Central to arrange the details of the traffic contract between this company and the Michigan Central which was referred to in this column last week.

Troy & New England.—About seven miles of this railroad, southeast of Troy, N. Y., are to be built this year and contracts for this section of the line have recently been let. The road will be substantially built and will carry freight, but will be operated by electricity. The project has been talked of for some time and surveys were made several years ago for the line from Troy to the state line, but actual work was never begun until the contracts above referred to were made. The line is to begin in the southeast portion of Troy at the terminus of the Troy City Railway and it will extend thence southeast to Averill Park. The contracts so far given out include the grading, ties and rails, electrical equipment, steam plant and some of the cars. T. W. Harris & Co., of New York City, will do the grading and tracklaying, and up to the present time about two miles has been graded. The railroad to Averill Park is to be in operation by Aug. 1. Westinghouse generators, motors and engines and Manning boilers will be used. The control of the syndicate is invested in an executive committee, of which George T. Lane, of Troy, is chairman. Wm. G. Raymond, of Troy, is Engineer for the syndicate. The grading is light throughout. There will be 10 small iron bridges, but temporary trestles will be built to insure completion by Aug. 1. The road is suburban in character; but there are considerable manufacturing interests in the villages of West Sand Lake and Averill Park which will furnish freight.

Virginia, Fredericksburg & Western.—The county courts of Northumberland and King George counties, Virginia, have ordered a vote to be taken in each county on the proposition to subscribe to the stock of this road. The vote will probably be taken next month. This project is for a line south of Fredericksburg, Va., through the northern neck of Virginia.

Winnipeg & Hudson Bay.—It is announced by the President of the company, Hugh Sutherland, that the grading for this line will begin immediately at a point near Gladstone on the Manitoba & Northwestern road, about 50 miles northwest of Winnipeg. It is expected to complete about 125 miles of the line this season. The surveys are still in progress under Chief Engineer Stewart and as soon as the location is finished the subcontracts will be given out. Grant, Foley Bros & Co., of St. Paul, have the contract for the section to be constructed this year.

GENERAL RAILROAD NEWS.

Allegheny & Kinzua.—Judge Barrett, in a Special Term of the Supreme Court of New York, has just decided in favor of the bondholders, the action brought against S. S. Bullis and Mills W. Barse, directors of the railroad, and the Central Trust Co., of New York, which has been pending for years in the Supreme Court. The company was organized with a capital stock of $500,000, Messrs. Bullis and Barse owning a majority of this stock. Prior to 1890 negotiations were in progress for the extension of the line and a merger with several small railroads. Bonds were issued to secure a loan, but the bondholders claim that Bullis and Barse neglected to comply with the conditions of the mortgage by placing under this lien 30,000 acres of timber land along the railroad valued at $18 an acre. The bondholders brought suit, and the court has sustained the charges made by them. Judge Barrett finds that Messrs. Bullis and Barse were unable to convey the land in question, and that the bondholders are entitled to damages. Sixty days are allowed to the defendants to convey the property to the Trust Co., in accordance with the requirements of the mortgage. Otherwise they must pay the Trust Co. over $292,000 damages sustained by the bondholders.

Atchison, Topeka & Santa Fe.—The statement of earnings for April shows a gross increase of $38,325 over last year, and with reduced expenses of $78,799 a net gain of $117,124. Compared with 1893 gross earnings are $600,928 behind, and net earnings are $439,878 less. The increased gross earnings occur on the St. Louis & San Francisco and Colorado Midland, the main line and Atlantic & Pacific showing lessened receipts. Expenses were also reduced on all divisions except the Atlantic & Pacific, which increased $10,524. The comparative statement follows:

ATCHISON, TOPEKA & SANTA FE PROPER.

Month of April:	1894-95.	1893-94.	Inc. or Dec.	
Mileage	6,481	6,695	D.	214
Gross earn	$2,356,962	$2,393,776	D.	$36,813
Oper. exp	1,947.011	2,003,007	D.	55,996
Net earn	$409,951	$390,769	I.	$19,182
Since July 1:				
Gross earn	$24,366,568	$27,084.858	D.	$2,718,289
Oper. exp	18,487,494	18,918,937	D.	431,443
Net earn	$5,879,074	$8,165,920	D.	$2,286,843

ATCHISON, TOPEKA & SANTA FE.—ENTIRE SYSTEM.

April:				
Mileage	9,103	9.321	D.	218
Gross earn	$3,311,248	$3.272,923	I.	$38,325
Oper. exp	2,632,496	2,716,296	D.	78,780
Net earn	$678,752	$561,6.7	I.	$117.124
Since July 1:				
Gross earn	$33,597,302	$36,182,406	D.	$2,58 ,1'4
Oper. exp	24,885,553	25,789,853	D.	904,000
Net earn	$8,711,749	$10,392,553	D.	$1,681,103

The Joint Executive Reorganization Committee of the company annouces that the time within which deposits of bonds and stock may be made under the reorganization plan has been extended to July 8, after which deposits will be received only upon penalty of 1 per cent. on the par amount. The committee announces the following deposits with the Union Trust Co. of New York: General mortgage fours, $122,466,000 of a total issue of $123,320,767; seconds, Class A, $75,435,500 of a total issue of $79,937,500; seconds, Class B, $4,884,500 of a total issue of $5,000,000; stock, 934,089 shares of a total issue of $1,020,000.

Baltimore & Lehigh.—An effort is being made to harmonize the management of the Baltimore & Lehigh Railroad Co. in Maryland with the management of that part of the line located in Pennsylvania. At a result of the litigation about the road during several years, the divisions were sold some time ago. The part of the road in Pennsylvania was sold under a decree of the courts in that state, and the part in Maryland was sold under a decree of the United States Court in Maryland. The two divisions were bought by different purchasers, and since the sales there has been a lack of harmony in the management of the two sections.

Chattanooga Union.—The Alabamba Great Southern Railway purchased the Chattanooga Union and Union Railways, at Chattanooga, on June 18, securing terminal facilities in the city. The two roads completely encircle the city, and have branches to six outlying suburbs. The roads were sold under a decree of the United States Court, and were bid in at $110,000. The property is bonded for $600,000. The Alabama Great Southern has held a controlling interest since 1891. The lines include 43 miles of track.

Chesapeake, Ohio & Southwestern.—A long expected decision was handed down by the Kentucky Court of Appeals last week in the decree that the Louisville & Nashville cannot acquire or buy the property of the Chesapeake, Ohio & Southwestern from Louisville to Memphis, with valuable terminal facilities at Louisville, Paducah and Memphis. The court sustained injunction proceedings begun in the lower court at the instigation of the Governor of Kentucky, who held that the Constitution prevented the purchase of competing or parallel lines. The court held that there was no provision in the Constitution by which the road could be acquired. The Louisville & Nashville held its charter as a defense, but the court held that this pertained only to the purchase of branch lines. In conclusion, the court holds:

"The power of a state to foster competition, and, by reasonable enactments, prevent monopoly of railroad transportation, seems to be well recognized, and the fact that nearly two-thirds of the states have now and have had for years provisions either in their constitutions or statutes similar to that in our Constitution, and the power to enforce them have never been questioned, seems to be persuasive of their validity, and convincing of their necessity. Such state laws are not, in a proper sense, regulations of interstate commerce, nor does their enforcement infringe upon the power of Congress to regulate such commerce." The decision largely augments the effort of the Illinois Central to get control of the Chesapeake, Ohio & Southwestern. The Illinois Central now holds in trust for the Louisville & Nashville the bonds of the Chesapeake, Ohio & Southwestern. The Illinois Central has been anxious to retain individual control, and was prepared to contest the claims of the Louisville & Nashville had the lower court been reversed. Now that the Louisville & Nashville cannot acquire the property, it is thought that the Illinos Central will operate it as soon as the receivership can be terminated.

Chicago, Burlington & Quincy.—The statement of earnings for April shows a gain over 1894 in passenger and general income, but a considerable decrease in freight. Fixed charges were increased $17,752, and a deficit of $19,707 resulted, compared with a surplus of $43,075 in 1894, a surplus of $53,313 in March, and deficits of $208,619 in February, and $105,264 in January. For four months a deficit of $280,273 is shown, against a surplus of $535,762 in 1894. The statement is tabulated below:

Month of April:	1895.	1894.	Inc. or dec.	
Freight	$1,435,415	$1,650,630	D.	$215,214
Passenger	568,444	541,491	I.	*26,953
Mail, etc	334,285	303,526	I.	*3 ,759
Gross earn	$2,338,145	$2,495,647	D.	$157,502
Oper. exp	1,542,852	1,655,324	D.	112,472
Net earn	$795,293	$840,323	D.	$45,030
Charges	815,000	797,248	I.	*17,752
Surplus def	$19,707	43,075	D.	$62,782
Jan. 1 to April 30:				
Gross earn	$9,032,107	$10 280,375	D.	$1,248,268
Oper. exp	6,052,380	6 555,622	D.	503,242
Net earn	$2,979,727	$3 724,753	D.	$745,026
Charges	3 260,000	3 188,901	I.	7 ,100
Surplus def	$280,273	$535,762	D.	$816,035

Chicago, Peoria & St. Louis.—Judge Allen, of the United States Court at Springfield, Ill., has issued an order authorizing Receiver Bostworth to issue $200,000 additional receivers' certificates to secure right of way through and terminal facilities in Springfield; for stone ballasting the roadbed north of Springfield and South of Glen Carbon, for substituting steel spans for wooden trestles across the Sangamon River and other purposes.

Consolidations in New England.—The long anticipated absorption of the Concord & Montreal by the Boston & Maine is about to take place. The shareholders of both roads have been summoned to meet June 29 to vote on a lease for 91 years. All the details of the plan have not been given out, but in a general way it contemplates the assumption by the lessee of all fixed charges and the payment of a rental equal to 7 per cent. on all classes of Concord & Montreal stock. The stock of the Concord & Montreal road is to be increased $1,200,000 and sold at about $125 per share, the proceeds to go toward retiring the floating debt, to pay the award in the Manchester & Lawrence suit, to build two new bridges over the Merrimac and improve the terminals at Manchester.

The Concord road lay right in the midst of the territory covered by the Boston & Maine. It not only ran through the middle of the field but branched out on the southern and northern sides, and made important connections. The Boston & Maine will now have nearly every mile of line in Northern New England east of Vermont. Controlling, through the ownership of stock, the Maine Central, St. Johnsbury & Lake Champlain and Portland & Rochester roads, it will have a complete monopoly in the territory indicated.

We shall then have the mileage of New England divided up as follows:

	Miles.
Boston & Maine (owned and leased)	1,743
Controls in addition	1,01
Total	2,762
New York, New Haven & Hartford	1,451
New York & New England	559
Fitchburg	4 0
Boston & Albany	389
Central Vermont	772
Six companies, total mileage	6,383

Poor's Manual gives the entire railway mileage of New England in 1893 as 7,019; and it will be seen that all but an insignificant portion is now in the control of six companies. And the end is not yet. There is a strong probability that the Fitchburg at no distant day will go to the Boston & Maine and the New England to the New Haven system. Then we should expect to see important parts of the Central Vermont passing into the hands of the Boston & Maine system. The Boston & Albany, even now the smallest of all the systems, is expected to maintain its independent and profitable existence, but if any change were to come in the distant future it would tend to fall into the arms of the related part of the Vanderbilt system to the south. Competition never was a marked feature of the railroad business in New England. It is now doomed to complete destruction.—*Springfield Republican.*

Georgia & Alabama.—The Savannah, Americus & Montgomery, which was recently sold at foreclosure to representatives of the bondholders, is to be reorganized under the above name. The charter of the new company is now being prepared, and other matters relating to the reorganization are progressing favorably. It is said that an agreement has already been made with a strong syn-

dicate to underwrite the first mortgage bonds of the new company.

Georgia Southern & Florida.—President W. Checkley Shaw announces that no change will be made in the organization of this line, which recently passed under the control of the Southern Railway. The road will continue to be operated under a seperate management instead of being merged with the Southern Railway. Some changes will be made in the Board of Directors. President Spencer and Second Vice-President A. B. Andrews, of the Southern Railway, being elected members.

Missouri Pacific.—Stockholders of the Missouri Pacific and St. Louis, Iron Mountain & Southern companies held a special meeting in St. Louis June 12, the meeting being a formal one, called to ratify the action of the directors in funding the floating debt of the two companies, in accordance with the plan announced some time ago. The resolution of ratification was passed by a unanimous vote. The plan provides for the execution of trust notes amounting to $12,000,000, this amount being sufficient to include the whole floating debt, and leave a surplus to be devoted to other purposes. The notes do not constitute a lien upon the roads, satisfactory collateral security, stocks and bonds held in the companies' treasury as assets, being given as assets.

Monterey & Mexican Gulf.—A dispatch from the City of Mexico announces that the Mexican Government yesterday recognized the transfer of the Monterey & Mexican Gulf Railroad to the Belgian syndicate, which holds the majority of the bonds. The amount of cash involved in the transfer is said to be $4,000,000 arranged for by A. Fresse, representative of the syndicate, who is now in Mexico. The transfer may cause some changes in the management.

New York, Lake Erie & Western.—The statement of earnings for April is published below:

	1894.	1895.	Inc. or dec.	
Gross earn	$1,949,373	$2,017,247	I.	$67,874
Oper. exp	1 506,428	1,493,447	D	6,980
Balance	$448,945	$523,800	I.	$74,854
Rental	163,073	197,614	I.	28,541
Net earn	$279,872	$326,186	I.	$46 313
Loss auxiliary co's	57,519	60,395	I.	2,876
Net of system	$222,353	$265,791	I.	$43,437
October 1 to April 30:				
Gross earn	$14.861.624	$14,60',570	D.	$261,054
Oper. exp	10,805,580	10 709,260	D.	96,319
Balance	$4,056.044	$3,891.310	D.	$164,734
Rentals	1.322,504	1,367,067	I.	44,563
Net earn	$2,733,540	$2,524,243	D	$209,297
Loss auxiliary co's	276 622	372,578	I.	95,955
Net of system	$2,453,918	$2.151,665	D.	$305,253

The gross earnings include, for both years, the income from other sources, with the exception of interest on securities, and the working expenses include the deductions from income, with the exception of the fixed charges and the state taxes.

The bill for the foreclosure of the second consolidated mortgage has been filed in the United States Circuit Court at New York, and an order has been entered by Judge Lacombe appointing the same receivers who now have control of the property. When default was made in interest charges on the funded coupon bonds of 1885, on June 1, it was understood that some mortgage would be selected for foreclosure. The proceedings for the foreclosure of the second consolidated mortgage have been undertaken merely as a preliminary to the reorganization. The Erie security holders have already lodged with J. P. Morgan & Co. their assent to any plan which may be formulated by that firm.

New York, New Haven & Hartford.—It was officially announced this week that about $9,500,000 new stock and $3,287,500 convertible debenture certificates will be issued on Sept. 1 for the purpose of carrying on the extensive improvements which are under way between New York and Boston. Most of the proceeds will be used in the elimination of grade crossings and the enlargement of terminals. Stockholders and holders of debentures will be allowed to subscribe for the new issues at par to the amount of one-fourth of their present holdings. Vice-President Hall made the following statement in regard to the issue of the new securities:

In the first place, the improvements between New York and New Haven are to be continued upon the same scale and upon the general plan already begun, but there remain the four-tracking of the Harlem River branch and the work in Stamford and Bridgeport, which will require large expenditures. Improvements at New Haven will also absorb a considerable amount. The work in eliminating grade crossings generally is also to proceed. At the time the convertible debenture certificates were authorized, in 1892, there was no expectation of leasing the Old Colony Railroad, with its mileage of about 625 miles. The business into the territory occupied by the Old Colony had only in a very small measure come over the New Haven road. Since its lease a constantly increasing proportion of business, destined to and from Old Colony territory, has been transferred to the main line between New York and Boston. The increase in this business has required unforeseen expenditures for terminals. The company has already purchased, in and about Harlem River, real estate to the amount of three-quarters of a million dollars. It has also been obliged to invest very large amounts of capital in the city of Providence and elsewhere for terminals and station facilities. Taking all together the money provided by the first issue of debentures has substantially all been expended, but there is another need and use for money for the benefit of the owners of the property. The ideal position for them to occupy would be to acquire all the fixed obligations, whether by leasehold or by interest on mortgages, and to own the entire property managed and operated by the company free from any burden upon the income except the inevitable taxes. Considerable investments have also been made in the purchase of the stock and bonds of the leased lines, in accordance with the company's charter, and as time goes on this policy of the company will undoubtedly be continued. The largely increased business which the company has assumed in its traffic arrangements necessitates a corresponding increase in ready capital with which to handle it. The present business of the company is as good as could be expected, and the outlook for the future seems bright. While there is no probability of an immediate resumption of dividends on a 10 per cent. basis, yet there is great confidence that regular dividends at the rate of 8 per cent. per annum can be maintained upon the increased capital.

Northern Central.—The company's officers now have control of the entire Sparrow's Point Division. The five-mile section between Dunkirk and Sparrow's Point, which, together with the rolling stock, was owned by the Maryland Steel Co., has been transferred to the Northern Central. The entire road is 12 miles in length, and up to the period of falling off of work at Sparrow's Point was very profitable.

Oregon Railway & Navigation Co.—Last week the hearing before the special master in the foreclosure suit brought by the Farmers' Loan & Trust Co., of New York City, trustee under the consolidated mortgage bonds, against the Receivers of the Union Pacific pertaining to the settlement of their accounts as former Receivers of the company, and the present Receiver, Mr. E. McNeil, was closed at Omaha last week, and the matter was taken under advisement by the master.

Pittsburgh, Cleveland & Toledo.—The directors have called a meeting of the stockholders for July 10, to vote on a proposition to authorize the issue of $4,000,000 50-year 4½ per cent. bonds, and also on the question of purchasing the railroad and property of the Trumbull & Mahoning Railroad Company. The railroad is a leased line of the Pittsburgh & Western, owning a road from Newcastle Junction, Pa., to Akron, O., 77 miles. The Trumbull & Mahoning is a branch in Pennsylvania and Ohio, about 10 miles long, built within a year or two.

Providence & Springfield.—It is announced that four-fifths of the stock of this company had been deposited with the Union Trust Co., of Providence, on June 12, when the time limit in which that company agreed to pay $90 a share for the stock expired. The purchase of this stock is understood to be in the interest of the reorganization committee of the New York & New England, as stated in this column last week. M. J. Perry, one of the receivers of the New England, is one of the directors of the Union Trust Co., of Providence.

St. Louis & San Francisco.—The United States Circuit Court at St. Louis has given a reply to the receivers of the St Louis & San Francisco, who six months ago asked the Court to grant an order annulling the agreements whereby four local feeders were leased to the St. Louis & San Francisco. The roads are the St. Louis, Salem & Arkansas, the St. Louis, Kansas City & Southwestern, the Kansas Midland and the Kansas City & Western, aggregating 200 miles of track. The Court denies the petition, and holds that it would be impolitic, in view of the improved conditions, to cut off alliances that must soon become profitable.

Savannah & Western.—The Bondholders' Committee, which now claims to represent about 90 per cent. of the bonds, has decided not to accept the terms offered in the proposed plan of reorganization of the Central Railroad & Banking Company of Georgia on the ground that the offer is not liberal enough. Particulars of this plan were published in this column last week. The interests favorable to the plan, in answering this committee, state that the Central Railroad & Banking Co. of Georgia owns $1,628,000 of the Savannah & Western first mortgage bonds. Under the plan of reorganization, these bonds so held will be cancelled. The plan also relieves the Savannah & Western of the necessity of financing its floating debt, relieves it of a claim of $1,000,000 deficit in operating by the Georgia Central Receiver, and a further claim for $1,200,000 on account of equipment. The Savannah & Western Bondholders' Committee, it is asserted, represents $5,400,000 out of $7,755,000, or less than 70 per cent. of the total issue.

Southwestern of Georgia.—Messrs. Thomas and Ryan have been officially notified by the Southwestern Railway Company of its acceptance of the terms of their plan for the reorganization of the Central Railroad & Banking Co. of Georgia. It is expected that similar action will be taken by the Augusta & Savannah Railroad Company shortly.

Worcester, Nashua & Rochester.—The Massachusetts Railroad Commissioners gave a hearing June 14 on the petition of the railroad for approval of an issue of 200,000 bonds, as authorized under the laws recently enacted by the Massachusetts Legislature and also the Legislature of New Hampshire. During the hearing it developed that $71,500 bonds had been issued since June 30 of last year without the knowledge or approval of the Railroad Commissioners, and a statement was made by Charles A. Sinclair, one of the directors of the New York, New Haven & Hartford, to the effect that his predecessors had indulged in systematic stealings which amounted to 3 per cent. a year. It was claimed that the issue was made in ignorance, and the chairman of the board said that it would be necessary for the company to ask the board for approval of an issue of stock to that amount, as it had never been made. This will be done.

TRAFFIC.

Traffic Notes.

Immigration, after steadily declining for nearly two years, has begun to increase again. The May arrivals number 49,144, against 33,284 for the month a year ago.

Freight rates from the coast to the City of Mexico are now so low that merchants are ordering unusually large quantities of goods from this country and from Europe.

The Central Vermont has reduced freight rates to the West to even a lower point than did the Chesapeake & Ohio. By the Ogdensburg line all western rates are now on the basis of 30 cents per 100 lbs. (first class) to Chicago.

Representatives of the principal railroads of the South met in New York City June 13 and 15 to discuss the renewal of the agreement of the Southern Railway and Steamship Association which expires July 31. Mr. St. John, of the Seaboard Air Line, was a member of the committee which was chosen to draw up an agreement.

It is reported that some New Orleans merchants have combined to establish a line of steamers between that port and Colon, and that they have made a contract for through billing over the Panama Railroad. It is said that in consequence of this the Southern Pacific has already reduced freight rates between San Francisco and New Orleans about 50 per cent.

The Chesapeake & Ohio has reduced freight rates from New York to the West from the regular basis (65 cents, first class), New York to Chicago, to 35 cents. The representatives of the road allege that the trunk lines have not restored rates as they promised to, and they say they have withdrawn their application for admission to the Trunk Line Association.

At the annual meeting of the Texas Car Service Association, at Houston, on June 10, reports were presented showing that 643,977 cars were handled during the year, being about 63 per cent. more than for the preceding year; but the expenses increased only one per cent. Over 98 per cent. of the cars were released within three times It was decided to re-establish the cotton weighing bureau from Aug. 1, the Association being convinced of the benefits from having a check upon the weights of cotton.

Several Kansas railroads have notified the commissioners of that state that they will not comply with the law passed at the last session of the legislature requiring railroads to carry the state militia at one cent per mile per man. The roads claim that this law requires service to be performed at less than cost which, according to Justice Brewer's decision in the Nebraska case, would be unconstitutional; and it is also claimed that the law violates the state constitution in giving the penalties to the state militia fund.

The Milk Producers' Protective Association (Chester, N. Y.), which seems to have the support of milk shippers in all directions around New York City, has filed with the Interstate Commerce Commission a complaint alleging unjust rates on milk to New York. The list of companies named in the complaint includes practically every road bringing milk to New York. It is claimed that the rates are made unequal by placing towns which are long distances apart in the same group; that they are not based on the value of the product, the cost of carriage or cost of special service; and that other freight requiring like special service is carried much cheaper. It is also claimed that the fourth section of the law is violated. The complaint seems to have been prepared with great care, and the farmers have engaged as counsel Messrs. Evarts, Choate & Beaman.

Chicago Traffic Matters.

CHICAGO, June 19, 1895.

Eastbound rail shipments last week show a considerable decline, attributable undoubtedly to the concessions being made through other gateways. The principal sufferer appears to have been the Grand Trunk. The reason for this is that at the prevailing low rates on grain and dressed meats a point has been reached where this line cannot carry the goods without loss and nothing except an absolute necessity for "spot cash" would justify it in carrying the traffic at a loss.

Lake rates are weak and unsettled, owing to the light offerings. If it was not for the ore-carrying trade the bottom would fall out of all lake rates. With the cut rates prevailing on the rail lines there is practically nothing but ore being offered the boats. Grain from this port will probably barely fill out the line vessels for the balance of the month.

Eastbound rail rates are in as bad a way as last week, and there appears no hope for a restoration at present. With grain at 15 cents and less and packing house products 18 cents, a reduction of 12 cents from tariff, the outlook is a gloomy one. The Association officials are making heroic efforts to regain lost ground, but apparently with little success. The action of the Chesapeake & Ohio in refusing to co-operate with the trunk lines on westbound rates, is taken as an indication that the Ingalls lines do not propose to re-enter the Central Traffic agreement at present.

In the West, however, there are indications that the traffic officials have become frightened at the ruin that is threatening all the lines if their suicidal policy of cutting rates is longer persisted in, and at a meeting held on June 15 all the southwestern lines voted to restore all rates to the southwest and Texas points on June 29. This agreement was signed by the Missouri Pacific and the Missouri, Kansas & Texas, the lines which have been accused of making all the trouble. Before this agreement was reached, however, packing-house product rates had fallen to 10 cents per 100 lbs. from the Missouri to the Mississippi River, and from 18½ to 15 cents from Chicago to the Missouri River points, with still further reductions in sight. Undoubtedly the avowed policy of the Atchison, that it would protect itself in the only way left open to it while in the custody of the courts—by making open tariffs unless the situation speedily assumed a different aspect—had much to do with the result. No attempt will be made to form a new association until rates are restored. The Missouri Pacific declined to assent to the proposed amendments to the agreement of the Western Trunk Lines and consequently the only association west of the Mississippi River now in working condition is the Western Freight Association. It is believed, however, that the roads will stick to their agreement to restore rates and then again take up the question of forming a new association and apportioning the business.

An effort will be made by the committee of general managers of Eastern lines to hold a meeting next week to consider what can be done to restore rates in Central Traffic Association territory.

An attempt is being made also to restore Texas rates in Southern Traffic Association territory. The action of the Atchison lines, in publishing an open tariff of 18 cents on packing-house product from Kansas City to Texas points, has had the effect of bringing some of the other lines to their senses in a measure. When it is taken into consideration that this reduction is nearly 40 per cent. of the established rate, it will be seen how great the manipulation has been.

Rates to Utah common points have been demoralized by the action of the Union Pacific in making a cut of about 74 per cent. on first class from the Missouri River to Utah common points. The Chicago competitors of the Union Pacific have reduced all classes westbound on a scale running from 95 cents reduction in first class to 55 cents on Class E.

No progress whatever has been made in the effort to form a new Western passenger association. The meeting last week disclosed such radical differences of opinion that the passenger men gave up the job in disgust and went home—that is, those of them who were present—many of the lines not being represented.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending June 15, amounted to 45,786 tons, against 51,718 tons during the preceding week, a decrease of 5,932 tons, and against 45,861 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	WEEK TO JUNE 15.		WEEK TO JUNE 8.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	2,920	6.4	3,493	6.8
Wabash	3,527	8.7	4,376	8.5
Lake Shore & Mich. South.	5,686	12.3	6,131	11.9
Pitts., Ft. Wayne & Chicago	5,919	13.0	7,838	15.1
Pitts., Cin., Chi. & St. Louis.	7,598	16.5	5,981	11.5
Baltimore & Ohio	4,321	9.4	5,402	10.4
Chicago & Grand Trunk	2.038	4.4	5,241	10.1
New York, Chic. & St. Louis	5.378	12.1	5,426	10.5
Chicago & Erie	6.738	14.7	5,590	10.8
C., C., C. & St. Louis	1,651	3.5	2,237	4.4
Total	45,786	100.0	51,718	100.0

Of the above shipments 1,335 tons were flour, 17,273 tons grain and mill stuff, 7,574 tons cured meats, 7,988 tons dressed beef, 2,349 tons butter, 1,383 tons hides, and 5,949 tons lumber. The three Vanderbilt lines carried 30.8 per cent.; the two Pennsylvania lines 29.5 per cent.